North American Burn Society
37th Annual Conference
Park City, Utah
January 19-24, 2019
Grand Summit | nabsociety.org
Purpose

The purpose of this program is to disseminate burn and wound care knowledge to multidisciplinary burn team members that is practical, current and relevant; that when put into practice will improve the quality of patient care. This symposium should be attended by all multidisciplinary members of the burn team.

Agenda

Saturday, January 19, 2019

SOCIAL | NON-CME ACTIVITY | LOCATION: KOKOPELLI PARLOR 1

6:00-8:30 Welcome Reception

Sunday, January 20, 2019

CME PRESENTATIONS | LOCATION: ARROWHEAD

<table>
<thead>
<tr>
<th>Moderator: Sigrid Blome-Eberwein, MD</th>
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<tbody>
<tr>
<td>6:30-7:30 a.m. Breakfast</td>
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<tr>
<td>7:00 a.m. Welcome and Introductions</td>
<td>Jeffrey S. Litt, DO FACS</td>
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<tr>
<td>7:10 Cultured Epidermal Autograft Usage in Reducing Major Burn Injury Length of Stay and Complications – Case Series</td>
<td>Jeffrey S. Litt, DO FACS</td>
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<tr>
<td>7:30 Evaluation of Outpatient Burn Care Metrics: Is It Bad for the Burn Clinic?</td>
<td>Paul Linneman, DNP CCRN CWS</td>
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<tr>
<td>7:50 From CNA to “Burn and Wound Specialist” – Lessons from the Field</td>
<td>Lisa Munoz, CNA</td>
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<td>8:10 International NABS Outreach – Burn Mission to India</td>
<td>Debra Reilly, MD</td>
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<tr>
<td>8:30 Treatment of a Full-Thickness Burn with Biodegradable Temporizing Matrix and Skin Cell Suspension: A Case Report</td>
<td>Kenneth Larson, MD</td>
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<tr>
<td>8:50 Impact of a Dedicated Burn/Trauma Advanced Practice Provider on Pediatric Burn Care and Outcomes</td>
<td>Dana Nofsinger, APRN</td>
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<tr>
<td>9:10-9:20 Wrap-up and Evaluation</td>
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CORPORATE PRESENTATIONS | NON-CME ACTIVITY | LOCATION: ARROWHEAD

| 4:00 p.m. Silon® Innovations in Burn Care | Jonathan Nischczak, OTR/L |
| 4:30 PolarityTE® - SkinTE™: Progressive, Regenerative Healing of Full Thickness Functionally Polarized Skin | Ryan Mathis, MD |
| 5:00 Poly-Medics Innovations | Angela Price |
| 5:30 Integra® Life Sciences - Long term outcomes associated with the use of “Artificial Skin” in soft tissue reconstruction | Randi Rutan |

SOCIAL | NON-CME ACTIVITY | LOCATION: PAINTED HORSE

6:00-8:00 Cocktail & hors d’ouerves - Sponsored by Integra® Life Sciences
# Agenda

**Monday, January 21, 2019**

## CMEPresentations | Location: White Pine

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<thead>
<tr>
<th>Time</th>
<th>Presentation</th>
<th>Speaker</th>
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<tbody>
<tr>
<td>6:30-7:30 a.m.</td>
<td>Breakfast</td>
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<tr>
<td>7:00</td>
<td>Challenges and Alternate Methods for the Management of Severe Lower Extremity Burns</td>
<td>Renata Fabia, MD</td>
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<tr>
<td>7:20</td>
<td>Dermal Regeneration Template versus Full-Thickness Skin-Grafting in Palm Burn Contracture Release</td>
<td>Sigrid Blome-Eberwein, MD</td>
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<tr>
<td>7:40</td>
<td>The Effects of Time Since-Injury of Burn Wound Healing Prediction Using Artificial Intelligence and Multispectral Imaging</td>
<td>Jeffrey Thatcher, PhD</td>
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<tr>
<td>8:00</td>
<td>Novel Homologous Skin Construct Used for Regeneration of Full Thickness Skin in Burn Injuries: Clinical Applications and Outcomes.</td>
<td>Nikolai Sopko, MD PhD</td>
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<td>8:20</td>
<td>Keynote Speech From Burn Survivor</td>
<td>John O’Leary</td>
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<tr>
<td>9:10-9:20</td>
<td>Wrap-up and Evaluations</td>
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## Social | Non-CME Activity | Location: PolarityTE, Salt Lake City | Optional

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
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<tbody>
<tr>
<td>9:30-11:30</td>
<td>Tour of PolarityTE®, Inc. - Transportation provided - meet in the Grand Summit Lobby</td>
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## CorporatePresentations | Non-CME Activity | Location: White Pine | Apres Ski Refreshments

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<thead>
<tr>
<th>Time</th>
<th>Presentation</th>
<th>Speaker</th>
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<tbody>
<tr>
<td>4:00</td>
<td>Vericel - Manufacturing and SOP's</td>
<td>Preston Demeritt, BSN RN</td>
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<tr>
<td>4:30</td>
<td>KCI® - KCI Technology Meets the Reconstructive Ladder</td>
<td>John Harper, PhD</td>
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<tr>
<td>5:00</td>
<td>Avita Medical - Cost-effectiveness of RECELL®: Autologous Cell Harvesting Device (ACHD) vs STSG for Treatment of Severe Burns in the United States</td>
<td>Jeremiah Sparks</td>
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<tr>
<td>5:30</td>
<td>AlloSource® - Amnion</td>
<td>Jeff Chiesa, MBA</td>
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<tr>
<td>6:00</td>
<td>Medline Industries - The Science Behind Lopex®</td>
<td>Debashish Chakravarthy, PhD</td>
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<tr>
<td>6:30-7:30</td>
<td>Executive Board Meeting - Officers and Past Presidents of NABS</td>
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## Agenda

**Tuesday, January 22, 2019**

### CME PRESENTATIONS | LOCATION: WHITE PINE

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<tr>
<th>Time</th>
<th>Speaker/Title</th>
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<tr>
<td>6:30-7:30 a.m.</td>
<td>Breakfast</td>
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<tr>
<td>7:00</td>
<td>Pseudosarcoma and the Burn Surgeon</td>
<td>Dhaval Adhvaryu, MD FACS</td>
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<td>7:20</td>
<td>Compassionate Use of an Autologous Skin Cell Suspension in a Patient with a Large Defect due to Necrotizing Soft Tissue Infection</td>
<td>Kevin Foster, MD MBA</td>
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<td>7:40</td>
<td>The Health Economic Impact of Introducing a Technology into the Burn Center: A Case Study</td>
<td>Kevin Foster, MD MBA</td>
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<td>8:00</td>
<td>Grant Writing for Rehabilitation and Outcomes after Burn Injury: Perspectives from a NIDILRR-Funded Project</td>
<td>Dagmar Amtmann, PhD</td>
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<tr>
<td>8:20</td>
<td>Overview of the Burn Model System National Longitudinal Database: What’s Collected and How to Access the Data</td>
<td>Kara McMullen, MPH</td>
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<td>8:40</td>
<td>Research Conducted Utilizing the Burn Model Systems National Database: Illustrative Examples for the Non-BMS Researchers</td>
<td>Alyssa Bamer, MPH</td>
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<tr>
<td>9:00</td>
<td>How Should I Use Silver Sulfadiazine in My Burn Practice?</td>
<td>Robert Wroblewski, MD</td>
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<tr>
<td>9:20-9:30</td>
<td>Wrap-Up and Evaluation</td>
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### CORPORATE PRESENTATIONS | NON-CME ACTIVITY | LOCATION: WHITE PINE | APRES SKI REFRESHMENTS

<table>
<thead>
<tr>
<th>Time</th>
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<th>Presenter</th>
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<tbody>
<tr>
<td>4:00</td>
<td>Exsurco® Medical - Technology Behind the Amalgatore® SD</td>
<td>Mary Avery</td>
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<tr>
<td>4:30</td>
<td>Milliken® - New ASSIST Silver Absorbant Shapes &amp; Sizes</td>
<td>Katie Imber</td>
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<td>5:00</td>
<td>PolyNovo® - “I met a girl…”</td>
<td>Jay Bodet</td>
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<tr>
<td>5:30</td>
<td>Avita Medical - Evaluation of RECELL® in patients aged 1-16 years: Clinical Protocols for two Pivotal, Pediatric, Prospective, Randomized Controlled Trials</td>
<td>Andrew Quick</td>
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### SOCIAL | NON-CME ACTIVITY | LOCATION: THE FARM

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<tr>
<td>6:30-10:30</td>
<td>Conference Group Dinner</td>
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Agenda

Wednesday, January 23, 2019

CME PRESENTATIONS  | LOCATION: WHITE PINE

Moderator: Dhaval Adhvaryu, MD FACS
6:30-7:30 a.m. Breakfast

7:00 Establishing the Safety and Efficacy of RECELL® as an Autograft Sparing Technology for Definitive Closure of Burns James Holmes IV, MD (Presented by Kevin Foster, MD MBA)

7:20 Evaluation of Intubation Criteria in Facial Burns & Inhalation Injuries Sarah Larson, MS3

7:40 Successful Combination of Spray Keratinocytes and Cultured Epidermal Autografts: A Multimodal Approach to Early Wound Closure in Large Burns Leigh Spera, MD David Beesinger Scholarship Winner

8:00 Can the Burn Therapist have a Role in the Opioid Crisis? Margaret Seiler Stolpen, PT

8:20 E-Cigarette Burn > 60 Cases Phillip Fidler, MD FACS

8:40 A Practical Approach to the Use of Skin Substitutes for the Solo Practitioner Todd Zuhlke, MD

9:00 Wrap-up and Evaluation

CORPORATE PRESENTATIONS | NON-CME ACTIVITY | LOCATION: WHITE PINE | APRES SKI REFRESHMENTS

4:00 Urgo Medical - Vashe® for Burn Care Joe Hodges & Nick Casbarro

4:30 MiMedx® - The Science of Dehydrated of Amnion Chorion in Burn Care TBA

5:00 Avita Medical - Overview of the RECELL® Device: Obtain, Prepare, Deliver Karen Winn, RN Courtney Hymel Samuel Thompson

5:30-6:00 Business Meeting - All attendees welcome
Agenda

Thursday, January 24, 2019

CME PRESENTATIONS | LOCATION: WHITE PINE

Moderator: Jeffrey S. Litt, DO FACS

6:30-7:30 a.m. Breakfast

7:00 The Concept of Pediatric Second-Degree Burn Care Sigrid Blome-Eberwein, MD

7:20 Cultured Epidermal Autograft Use for Permanent Coverage of a Large Full-Thickness Burn in a Pediatric Patient: A Case Report Dawn Cloutier, BSN RN

7:40 Evaluation of Outcomes after Surgical Management of Hidradenitis Suppurativa Lucy Wibbenmeyer, MD

8:00 Six Years of Laser Treatments for Scars at Lehigh Valley Health Chris Zhang, MS3 NABSY Scholarship Winner

8:20-8:30 Evaluation and Adjourn

Continuing Education

Medical

The Office of Continuing Education, School of Medicine, University of Missouri is accredited by the Accreditation Council for Continuing Medical Education (ACCME) to provide continuing medical education for physicians.

The Office of Continuing Education, School of Medicine, University of Missouri designates this live educational activity for a maximum of 7.3 AMA PRA Category 1 Credit(s)™. Physicians should only claim the credit commensurate with the extent of their participation in the activity.
CME Presentation Faculty

Dhavall Adhvaryu, MD FACS
Attending Physician, Burn Center
Baton Rouge General Medical Center
Baton Rouge, Louisiana

Dagmar Amtmann, PhD
Research Professor
University of Washington
Seattle, Washington

Alyssa Bamer, MPH
Research Scientist
University of Washington
Seattle, Washington

Sigrid Blome-Eberwein, MD
Attending Physician, Burn Center
Lehigh Valley Health Network
Allentown, Pennsylvania

Dawn Cloutier, BSN RN
Children's Hospital of Michigan
Detroit, Michigan

Renata Fabia, MD
Associate Professor of Surgery
The Ohio State University
Medical Director, Burn Program
Nationwide Children's Hospital
Columbus, Ohio

Philip E. Fidler, MD FACS
Burn and Reconstruction
Centers of America
Denver, Colorado

Kevin Foster, MD
Clinical Assistant Professor
University of Arizona
Chief, Arizona Burn Center
Vice-Chairman, Education & Research
Director, Surgical Research Program
Maricopa Medical Center
Phoenix, Arizona

James Holmes IV, MD FACS
Wake Forest University School of Medicine
Professor of Surgery
Director WFBMC Burn Center
Winston-Salem, North Carolina

Kenneth Larson, MD
Sarah Larson, MS3
Medical Student
Baylor College of Medicine
Houston, Texas

Paul Linneman, DNP CCRN CWS
Jeffrey S. Litt, DO FACS
Clinical Assistant Professor
Medical Director
Burn and Wound Program
University of Missouri Health
Columbia, Missouri

Kara McMullen, MPH
Research Scientist
University of Washington
Seattle, Washington

Lisa Munoz, CNA
John O'Leary
Burn Survivor

Debra Reilly, MD
Department of Plastic Surgery
University of Nebraska
Omaha, Nebraska

Nikolai Sopko, MD PhD
Chief Scientific Officer
Polarity TE, Inc.
Salt Lake City, Utah

Leigh Spera, MD
Resident Physician
Indiana University
Indianapolis, Indiana

Margaret Seiler Stolpen, PT
Senior Physical Therapist
Rehabilitation Medicine
University of Iowa Hospitals & Clinics
Iowa City, Iowa

Jeffrey Thatcher, PhD
Chief Scientist
Spectral MD, Inc
Dallas, Texas

Robert Wroblewski, MD
Lucy Wibbenmeyer, MD
Clinical Professor of Surgery
Acute Care Surgeon
University of Iowa
Attending Physician, Burn Center
University of Iowa Stead Family Children's Hospital
Iowa City, Iowa

Chris Zhang, MS3
Medical Student
Lehigh Valley Hospital Network
Allentown, Pennsylvania

Todd Zuhlke, MD
Plastics & Reconstruction Institute of Denver, LLC
Thornton, Colorado
Evaluation

After the conference is complete. Enter this link into your web browser to complete the online survey.

https://www.surveymonkey.com/r/NABS2019

We have provided a printed copy of the Activity Evaluation Form for you to keep track of your responses. You can use that copy later to enter your responses into the online Activity Evaluation Form. The copy is for your personal use only.

Scholarship Awards

Congratulation to the following scholarship winners:

Chris Zhang, MD - The NABS Scholarship Award
Leigh Spera, MD - The David Beesinger Scholarship Award
Cultured Epidermal Autograft Usage in Reducing Major Burn Injury Length-of-Stay and Complications

JEFF LITT | DO FACS

Practice Gap: Large total body surface area (TBSA) burns, typically defined as greater than 50% burn surface area, are associated with significant length-of-hospitalizations along with frequent development of complications1,2. Ultimate wound closure is the main goal of inpatient care. Usage of Cultured Epidermal Autografts (CEA) in a recent 65% TBSA full thickness burn resulted in a length-of-stay (LOS) of approximately 2 months and expeditious wound closure with minimal complications.


Introduction: Care of the patient with a major burn injury (>50% TBSA) requires true multidisciplinary care and diligent planning. The ultimate goal of wound closure is always at the forefront of the plans. Early consideration for usage of CEA, careful planning around its expected readiness for delivery, and appropriate wound care prior to CEA delivery can markedly reduce complications and ultimately reduce hospitalization as well as improve functional outcomes.

Methods: A 59 year-old female presented to the burn center with approximately 65% TBSA full thickness thermal burns to the torso, bilateral arms, and bilateral legs following a boat explosion. Initial debridement occurred immediately on arrival to the burn center in a staged fashion, and a full-thickness specimen of unburned skin was sent for CEA processing during her initial debridement. An operative plan was developed to ensure recipient sites would be well prepared for implantation of CEA approximately 3 weeks later. The plan was slightly modified when the patient developed a Pseudomas pneumonia requiring lung-protective treatment and antibiotics. Ultimately on HD29 the patient received her CEA autografts, utilizing a “sandwich” technique overlying 6:1 meshed autograft on her legs and torso. Wound culture swabs showed a similar Pseudomonas to her pneumonia, and she was treated with topical gentamycin solution with 4 hour “drying out” period twice daily. Grafts were evaluated POD 9 with 80+% initial “take”. Continued wound care, liberation from the ventilator, and increase in physical therapy occurred over the next 3 weeks. The patient was discharged to inpatient rehabilitation where she stayed for another 2 weeks prior to dc home.

Results: The initial take rate of the CEA was approximately 80%. She was discharged from the hospital on PBD 61, despite an estimated LOS of 103 days. She is now home and living independently.

Conclusions: Usage of CEA in major burn patients has markedly reduced time to wound closure at a Midwestern academic burn center, resulting in reduced hospitalization, reduced complications, improved patient outcomes, and improved patient and family satisfaction. Doing so, however, requires careful initial planning and a detailed (but malleable) operative plan/timeline to ensure maximal CEA “take”, and thus speedier wound closure.
Evaluation of Burn Care Metrics: Is Outpatient-based Burn Care Bad for the Outpatient Burn Clinic?

PAUL LINNEMAN | DNP CCRN CWS

Introduction: Most thermal injuries are managed in the outpatient setting. In 2016 approximately 486,000 Americans received treatment for burn injuries, while only approximately 40,000 were hospitalized for their burns. That leaves approximately 92% of all burn-injured patients treated as outpatients. While a majority of these burn injuries are considered very minor and exceedingly amenable to outpatient care, the “envelope” of what is considered appropriate for outpatient is being pushed. At the University of Missouri, outpatient burn care is the norm, with inpatient admission reserved for the large, resuscitative-sized or otherwise complicated burn patient. How has this affected workflow in the outpatient burn clinic? We reviewed our data and evaluated outpatient flow, cost and other metrics to determine the effect of aggressive outpatient management of burn injuries.

Methods: Logs from trauma activations, outpatient visits, and inpatient admissions were reviewed to determine numbers of patients and their characteristics treated in the emergency department, outpatient, same day surgery and day of surgery admission, and inpatient settings. All patients were de-identified, and this was classified by the IRB as a quality improvement project not needing review.

Results: Patients admitted with partial thickness burns showed a decrease in length of stay by 73% over 3 decades, from a mean of 5.8 days in 1988 to 1.6 days in 2018. Days per percent burn in these patients dropped from 0.56 to 0.17. Patients who required one surgery had a reduction in hospital stay from 5.8 mean in 2008 to 2.9 in 2018. Reduced hospitalization due to changes in criteria for admitting burn patients were harder to quantify with existing data. Inpatient visits are down, and it seems clear that the proportion of time the patients are at home with burns not yet epithelialized is increased. The total time for the initial two burn outpatient visits is nearly double for those in the category of severe burns treated with 0-1 days hospitalization, compared with those not severe enough for a trauma activation.

Conclusions: At our institution, and nationally, changes in burn care delivery have shifted much of the burden of care to the clinic and to the patient and family. Here we’ve quantified some of these changes at a Midwest burn unit. Strategies for evaluation of burn wound treatment, hydration and nutrition, rehab & ADL limits, pain management, economics and outcomes need to be developed and implemented.
Introduction: A Certified Nurse Assistant (CNA) helps patients with their healthcare needs under the supervision of a Registered Nurse (RN) or Licensed Practical Nurse (LPN). CNAs often work in a variety of healthcare settings in both the in- and outpatient healthcare worlds. CNAs are often described as “the eyes and ears” for their patients, helping communicate important patient information to the medical team. CNAs participate in patient care by performing or assisting with dressing changes, obtaining (and interpreting) vital signs, transferring patients, and procedural assistance. There can be frequent turnover in the CNA world, as it is often seen as a “stepping stone” to other healthcare positions. Education typically consists of a didactic and practical experience over several weeks to months, touching on important topics such as patient and family expectations, medical care, and wound prevention and care. In spite of initially starting out in the inpatient world at 2 nursing homes, my experience and knowledge grew exponentially after being hired as the Burn and Wound Clinic CNA at the University of MO. Inpatient CNAs are trained to prevent wounds; working at a Burn and Wound Center exponentially increased the knowledge and experience of treating complex and varied wounds, including diabetic foot ulcers, venous leg ulcer, lymphedema ulcerations, varying depth and size burns, with and without requiring skin grafting, pressure ulcers at various locations, as well as traumatic and surgical wounds. Trialing new technologies, such as epidermal and full-thickness micrograft techniques, application of dermal templates, complex negative pressure dressing application, and evaluation of Stratagraft skin substitutes have become fairly routine. Most of this knowledge came through the day-to-day experience of treating wounds. In time, by gaining this valuable experience in evaluating and treating these varied wounds, an expertise has developed that occasionally even informs the wound care choices our physicians make.

Conclusion: In spite of limited wound care education and training prior to starting at an outpatient Burn and Wound care Center, day-to-day exposure to this specialized and varied field has led to an expertise in evaluating and treating wounds of nearly all types.
Treatment of a Full-Thickness Burn Injury with Biodegradable Temporizing Matrix and Autologous Skin Cell Suspension: A Case Report

KENNETH LARSON | MD

Introduction: The RECELL® System is a newly FDA approved technology that allows point-of-care preparation and application of an autologous skin cell suspension (ASCS) for the treatment of acute thermal burn injuries. In pivotal randomized controlled trials, the use of this technology demonstrated reduction in donor skin requirements compared to conventional autografting techniques.

Patients with severe burn injuries in which ASCS may prove to be useful in achieving earlier definitive closure due to reduction in donor skin requirements, are also often treated with dermal substitutes to optimize functional and aesthetic results for their full-thickness injuries. Due to the availability of multiple dermal substitutes on the market, it is valuable to disseminate our experience with RECELL in conjunction with a split-thickness skin graft (STSG) on a full-thickness burn after using a Biodegradable Temporizing Matrix (BTM) to treat a patient with a life-threatening burn injury. BTM is used to generate a vascularized bed in wounds where the dermal structure has been lost to trauma or surgical debridement. In this case report we describe the treatment algorithm and clinical outcomes of the full-thickness wound to the leg after use of BTM and RECELL in combination with a 3:1 meshed autograft.

Methods: A 23-year-old male with a 60% TBSA burn injury due to a house fire was enrolled as part of a prospective uncontrolled observational study that was conducted under an Investigational Device Exemption (IDE 15945-NCT029992249) following ASCS treatment in an adult population with life threatening burn injuries (compassionate use). The patient suffered partial and full-thickness burn injuries to the head, chest, abdomen, bilateral upper and lower extremities, and back. This case focuses on treatment of the full-thickness injury to the left leg using BTM and ASCS.

Results: The patient underwent debridement and BTM placement to the left leg 10 days after admission to the burn unit. Approximately one month after BTM placement and integration, the temporary layer of the BTM substitute was removed and the dermal bed was prepared. A 3:1 meshed split-thickness skin graft was secured to the wound bed and ASCS was applied. The wound was dressed with a non-adherent, non-absorbant, small pore primary dressing. Five days after surgery, range of motion was assessed, and the patient had left knee flexion to -30°. At one-week post-autografting, the leg was 90% re epithelialized with mildly mismatched color, pigment, and texture. By 2 weeks, the leg was considered healed according to protocol (>95% re-epithelialization). The patient was able to walk 25 feet with moderate assistance at 10 days post-op, and at 15 days, had left knee flexion to 65°. By 26 days post-op the patient had 100° of knee flexion obtained and the newly formed skin remained robust and durable.

Conclusion: RECELL® is a novel autograft-sparing technology that allows preparation of autologous skin cell suspension at the patient’s point-of-care. In this case, the RECELL Device has been successfully used in conjunction with BTM to achieve definitive closure of a full-thickness burn wound.
Abstracts

Impact of a Dedicated Burn/Trauma Advanced Practice Provider on Pediatric Burn Care and Outcomes

Dana Noffsinger | APRN

Introduction: Advanced Practice Providers (APPs) have been shown to reduce patient length of stay and complications. An American Burn Association (ABA) verified Pediatric Burn Center created a dedicated burn APP role and instituted multidisciplinary family-centered rounds facilitated by the APP to enhance inpatient management. We hypothesized that dedicated burn rounds facilitated by an APP would improve patient care and decrease hospital length of stay.

Methods: A retrospective review from a single ABA verified pediatric burn center from January 2015 to December 2018 was conducted. This allowed us to capture data comparing 18 months prior and 18 months following implementation of a dedicated burn APP. Data collected included demographics and clinical outcomes along with patient/family satisfaction scores. This study was approved by our Institutional Review Board.

Results: There was an increase in admitted burn patients (N=246 vs 306), larger (> 5% TBSA) burns (N=76 vs 81) and burn patients requiring Intensive Care Unit (ICU) admission (N=18 vs 20) in the post-APP period. The pre and post-APP analysis showed a reduction in overall hospital length of stay (4.2 vs 3.2 days, p=0.0723) which was more pronounced in patients with > 5% TBSA burn (8.8 vs 6.7 days, p=0.1511). In addition, the complication rate for burn patients dropped from 10.5% before the APP role to 8.6% after the APP role.

Conclusion: Despite an increase in the number of burn patients, larger burns, and numbers of burns requiring ICU admission, patient length of stay and complication rate decrease. The addition of a dedicated burn APP and multidisciplinary family-centered rounds provides a benefit to pediatric burn patients at burn centers.
Abstracts

Challenges and Alternate Methods for the Management of Severe Lower Extremity Burns

RENATA FABIA | MD

Treatment of severe, circumferential lower extremity burns brings about many clinical challenges. These include vascular compromise leading to delayed healing, infections, decreased range of motion, contractures, and neuropathic pain. These challenges require innovative and creative use of various methods and techniques.

We present two cases that were ultimately treated by the use of the same material: Biodegradable Temporizing Matrix (BTM).

Case 1: Severe circumferential lower leg flame burn including area from above knee to toes.

Challenges: Lean patient with very little muscle mass non-compliant, need for escharotomies, exposed tendons and bones after burn excision, lymphatic chyle leak, neuropathic pain.

Case 2: Severe circumferential lower leg flame burn including area from upper thigh to the ankle

Challenges: Part of a burn with a majority of the injured tissue originally covered with CEA, infections, graft loss, chronic wounds, recurring contractures.

Conclusion: A use of BTM was has been a valuable technique in this limited trial case series at NCH for patients with deep circumferential lower extremity burn in whom other techniques were not successful. Further studies will be necessary to fully understand the role of BTM in the treatment of severe lower extremity burns.
Abstracts

Dermal Regeneration Template versus Full Thickness Skin Grafting in Palm Burn Contracture Release

SIGRID BLOME-EBERWEIN | MD

Introduction: Deep burns to large areas of the palmar surface of the hand remain a challenge in burn treatment. Early excision and grafting is not the first line option, especially since palmar thick skin equivalent is only available on the plantar surface of the feet and skin grafts from other body areas leave very obvious and different scars and contract horribly. When the entire hand surface area is affected by 3rd degree and deep second degree burns, the fingers and dorsum of the hand will be excised and grafted, leaving some of the palm to heal secondarily, if possible. These types of hand burns will then cause hand contractures that can significantly interfere with hand function.

M&M: Presented will be three cases of hand (palm) contracture release. In two cases a dermal replacement template (DRT) was used followed by thin split thickness skin graft, one case was released with full thickness skin graft (FTSG).

Results: The two cases with DRT release had better functional results post reconstruction. The full thickness grafted palm suffered some graft loss and post reconstruction re-scarring.

Discussion: The functional results after DRT reconstruction were encouraging. The two-step procedure with interim splinting and occupational therapy appears to aid in functional recovery and the DRT anti-inflammatory properties seem to have a positive effect on re-scarring. Obviously other means of reconstruction, including fascia flap or other free tissue flap reconstruction need to be considered and discussed.
Abstracts

The Effects of Time-since-injury on Burn Wound Healing Prediction Using Artificial Intelligence and Multispectral Imaging.

JEFFREY E. THATCHER | PHD

Introduction: Accurately assessing the severity and likelihood of healing for burn wounds is critical in assuring appropriate and expedient burn care. However, assessment can be difficult, especially as burn wounds have been shown to evolve over time since initial injury and change drastically in appearance. We are developing a novel device which uses multispectral imaging (MSI) and artificial intelligence (AI) to aid in determination of burn severity and healing potential. We imaged burn wounds as soon as patients arrived at a burn center and the AI algorithm has demonstrated promising results. However, it was unclear whether delayed use of the device would impact the algorithm’s accuracy in predicting healing potential.

Methods: Subjects were enrolled in a proof-of-concept clinical study within 72 hours of initial burn injury. A total of 35 burn wounds with various severities were imaged with our device repeatedly over the course of their first week of treatment. True severity of burns in each image was determined either by using healing assessments at day 21 post-burn or punch biopsies obtained at time of burn excision. Using this data, the AI algorithm was trained and algorithm accuracy for each image was determined. By comparing a pair of nested random-effects models predicting algorithm accuracy based on various burn characteristics using a chi-squared test, we were able to determine the effect of time-since-injury on algorithm accuracy.

Results: On average, the AI algorithm was 90.6% and 86.0% accurate in predicting healing potential for healing and non-healing burn wounds, respectively. Algorithm accuracy was not significantly impacted by increasing time-since-injury (p-value = 0.8437), and the random-effects model with a time-since-injury term shows predicted increases in accuracy for some burns and predicted decreases for others. Overall, we found changes in accuracy ranging from -0.28% to 0.56% per additional 24 hours since injury.

Figure 1: Accuracy over days since burn. (Top) The relationship between time-since-burn and accuracy for healing burns. (Bottom) The relationship between time-since-burn and accuracy for non-healing burns. Each color indicates a different study burn.

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**Abstracts**

*Continued...* The Effects of Time-since-injury on Burn Wound Healing Prediction Using Artificial Intelligence and Multispectral Imaging.

JEFFREY E. THATCHER | PHD

Conclusions: The effect of time-since-injury on algorithm accuracy was neither statistically significant nor clinically meaningful. There is no significant evidence to suggest that the device cannot be used at any time within the first week of burn injury.

Applicability of Research: This study shows results from a completed POC study for developing an aid to burn assessments. Performance of AI algorithms trained on the data collected using our MSI device gives high confidence that expedient, clinically relevant predictions of burn healing potential obtained are feasible using this technology.

External Funding Information: Biomedical Advanced Research & Development Authority (BARDA); contract # HHSO100201300022C.
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Novel Autologous Homologous Skin Construct Used for the Regeneration of Full-Thickness Skin in Acute and Subacute Burn Injuries: Clinical Application and Outcomes

NIKOLAI SOPKO | MD PHD

Split-thickness skin grafting (STSG) is the current standard of care for treatment of large cutaneous burn defects but this modality has a myriad of complications including: unsatisfactory aesthetic consequences, treated areas lack the function of normal skin and there can be significant donor-site morbidity. A novel autologous homologous skin construct (AHSC, SkinTE, PolarityTE, Salt Lake City, UT) has been shown to regenerate full-thickness functional skin while circumventing a painful, open donor site in a preclinical model. AHSC was used to treat large acute and subacute burns in multiple patients utilizing a small, full-thickness harvest site. Patients received a single treatment of AHSC, which resulted in complete epithelialization of the wound bed with increasing amounts of pigmented full-thickness skin within 2 months along with minimal donor-site morbidity. The patients maintained full range of motion of their extremities with no significant wound contraction of AHSC-treated areas. In summary, our clinical cases establish that AHSC has a robust re-epithelialization response when treating complex acute and subacute burn wounds and are capable of regenerating full-thickness, functional skin in a single application. AHSC is a cost-effective treatment for acute and subacute burn wounds by providing the desired clinical outcomes with reduced surgical resources and length of hospitalization for patients.
Compassionate Use of an Autologous Skin Cell Suspension in a Patient with a Large Soft Tissue Defect Due to a Necrotizing Soft Tissue Infection

KEVIN N. FOSTER | MD MBA

Introduction: Necrotizing soft tissue infections (NSTI) and necrotizing fasciitis (NF) can be aggressively progressive infectious processes necessitating radical surgical resections often leading to large soft tissue defects. These soft tissue defects can be challenging to reconstruct and to attain adequate epithelial coverage. This case history reports the use of an autologous skin cell suspension (ASCS) to facilitate epithelial coverage in a patient with an extensive necrotizing soft tissue infection treated under Investigational Device Exemption (IDE 15945 NCT029992249).

Methods: Medical records of the patient in question were retrospectively reviewed. Data collected included demographic data, length of hospital and ICU stay, number and character of operative procedures, and photographic data.

Results: A 37 year-old otherwise healthy female experienced 3 days of increasing redness and warmth over the left thigh and flank. She presented to a referring hospital and was initially treated with intravenous antibiotics. Due to progression of the disease process, she underwent emergent exploration and debridement. She had 2 further debridement procedures over the ensuing 48 hours. Cultures from wound and blood were all positive for Group A bet-hemolytic Streptococcus. She experienced septic shock and was transferred to the regional burn center for further care. At the burn center the patient required 4 more debridement procedures for a total area of 3900 cm2 (25% TBSA). These procedures were followed by treatment of the wound with NPWT for 2 weeks. On post-injury day 38, the patient underwent autograft with 2:1 meshed auto graft and ASCS to her entire wound. Donor site harvest was limited to the bilateral thighs. Skin graft take was > 95% at 2 weeks and the donor sites were healed within 10 days. The patient was discharged home in good condition.

Conclusions: ASCS was successfully used to achieve epithelial skin closure of a large soft tissue defect in a patient with an aggressive NSTI. Future studies are warranted to evaluate if treatment of these patients with ASCS has benefits in improving healing rates, pain reduction, and decreased hospital and ICU length of stay compared to current standard of care.

Applicability of Research to Practice: Application of ASCS in in patients with infectious skin processes may be particularly applicable for patients with large soft tissue defects.

External Funding: Supported in part by the U.S. Department of Health & Human Services ASPR/BARDA Contract HHSO100201500028C.
Abstracts

The Health Economic Impact of Introducing a Novel Technology into the Burn Center: A Case Study with Autologous Cell Harvesting Device

KEVIN N. FOSTER | MD MBA

Introduction: Recently, a novel autologous cell harvesting device (ACHD) was FDA-approved for the treatment of acute thermal burn injuries in patients 18 years of age or older. Randomized controlled pivotal trials with the device demonstrate comparable healing outcomes to standard of care treatment, using significantly less donor skin, without compromise to patient safety. Use of ACHD in clinical practice should be informed by both clinical evidence and likely economic impact to a burn center. This study presents clinical cases as well as analyses that projects the budget impact of ACHD for the Arizona Burn Center via consideration of key burn center costs, SOC surgical practices and patient mix.

Methods: A hospital-perspective model depicts the acute burn care pathway (wound assessment, debridement/excision, temporary coverage, permanent closure and rehabilitation). This published, validated US Burn Care Model leverages regression models from the ABA’s National Burn Repository to project number of excision, debridement and grafting procedures and length of stay (LOS) based on unique patient characteristics. Information on U.S. SOC practice patterns and hospital costs were derived from 12 burn surgeons and 3 U.S. burn centers. Use of ACHD was assumed to impact permanent closure and inpatient rehabilitation for deep partial-thickness and mixed depth (inclusive of full-thickness) burns of TBSA 10%+, with clinical impact based on trial publications. Model assumptions and inputs were validated or updated to reflect costs and practice patterns for the Arizona Burn Center.

Results: Use of ACHD enables an autograft sparing technology to be leveraged in clinical practice, translating into multiple benefits, including reductions in donor site and an estimated 66% reduction in grafting surgeries. These benefits support notable reductions in LOS (from 7723 to 6517 inpatient days), inpatient rehabilitation fees as well as OR time, materials and support staff costs. Considering patient mix and unique burn center costs for an estimated 400 patients with TBSA >10% annually, ACHD use is cost saving with a projected 16% (~$14M) reduction in total costs from $87M to $73M annually.

Conclusions: When considering costs and practice patterns from the Arizona Burn Center, use of ACHD alone and in combination with STSG is likely to reduce burn center costs and LOS.
Introduction: A long-term multi-center project called Burn Model System (BMS) has been federally funded since 1994 to examine the course of recovery and the health, employment, and community integration of burn survivors. The System consists of a prospective, longitudinal database, which will be explained in separate presentations, as well as site specific research projects and multi-center research projects and knowledge translation activities. This research program is supported by the National Institute on Disability, Independent Living, and Rehabilitation Research (NIDILRR), which also funds other rehabilitation and outcomes research. In this presentation presenters will provide a brief overview on NIDILRR funding opportunities and the grant submission process from a perspective of a successful NIDILRR funds recipient. This information would be useful for organizations/researcher interested in submitting applications for NIDILRR competitions applicable to burn related research.

Content: The presentation will summarize presenters’ experiences with: (1) several NIDILRR funding mechanisms applicable to burn research, such as Field Initiated Projects (FIPs), Advanced Rehabilitation Research and Training (ARRT), and Disability and Rehabilitation Research Projects (DRRPs) and (2) Essential components of NIDILRR proposals and how they differ from other funders (e.g., NIH).

Conclusions: To increase capacity of burn research clinicians and researchers should consider NIDILRR when seeking funding for burn research.

External Funding: This project was supported in part by grant number 90DP0053 and 90DPGE0004 from the U.S. Administration for Community Living, Department of Health and Human Services, Washington, D.C. 20201. Grantees undertaking projects under government sponsorship are encouraged to express freely their findings and conclusions. Points of view or opinions do not, therefore, necessarily represent official Administration for Community Living policy.
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Overview of the Burn Model System National Longitudinal Database: What’s Collected and How to Access the Data

KARA MCMULLEN | MPH

Introduction: The Burn Model System (BMS), a long term multi-center project, has been collecting data on outcomes of burn survivors for 20+ years. All participating BMS centers collect data on burn survivors and contribute the data collected to a publicly available National Longitudinal Database. The BMS database includes data from over 6,000 individuals with burn injuries collected from 1993 to present.

Content: This presentation will provide a brief history of the BMS longitudinal database, including at-a-glance inclusion criteria and variables collected since its inception, such as demographic and clinical characteristics, health and quality of life, pain, and community participation. Detailed information about how to access the data and resources available to researchers interested in utilizing the database will be provided.

Conclusions: Data collected by the BMS are available to external researchers to answer questions related to long-term outcomes of burn survivors. The process of accessing data is easy and brief, detailed documentation is available. Technical support is available to guide interested investigators in accessing and interpreting the data available.

External Funding: This project was supported in part by grant number 90DP0053 and 90DPGE0004 from the U.S. Administration for Community Living, Department of Health and Human Services, Washington, D.C. 20201. Grantees undertaking projects under government sponsorship are encouraged to express freely their findings and conclusions. Points of view or opinions do not, therefore, necessarily represent official Administration for Community Living policy.

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*Continued... Overview of the Burn Model System National Longitudinal Database: What's Collected and How to Access the Data*

**KARA McMULLEN | MPH**

*Figure 1. Timeline of Measures Administered to Adult Burn Survivors by Burn Model System National Longitudinal Database*
Abstracts

Research Conducted Utilizing the Burn Model System National Database: Illustrative Examples for Non-BMS Researchers

ALYSSA BAMER | MPH

Introduction: The Burn Model Systems National Longitudinal Database is a rich resource for researchers interested in conducting burn related research. Since its inception, there have been numerous publications that utilized the database to examine long-term psychological, functional, and community reintegration outcomes, as well as clinical burn characteristics.

Content: This presentation will provide an overview of several recent publications that have utilized the BMS database across a variety of topics. Publications discussed will cover the following specific topics: (1) Psychometric properties of the 5-D itch scale; (2) Development of a pediatric itch scale; (3) Satisfaction with life up to two years after burn injury; and (4) Factors associated with returning to work one year after burn injury. Publications will be presented in order to demonstrate the richness of the data contained in the database and the variety of topics that can be investigated using the database.

Conclusions: Clinicians and researchers can use the data collected by the BMS to study outcomes after burn injury. The database includes a broad range of health and community outcomes, and is freely available to clinicians and researchers interested in burn injuries.

External Funding: This project was supported in part by grant number 90DP0053 and 90DPGE0004 from the U.S. Administration for Community Living, Department of Health and Human Services, Washington, D.C. 20201. Grantees undertaking projects under government sponsorship are encouraged to express freely their findings and conclusions. Points of view or opinions do not, therefore, necessarily represent official Administration for Community Living policy.
How Should I Use Silver Sulfadiazine in my Burn Practice?

ROBERT WROBLEWSKI | MD

The use of silver sulfadiazine has been one of the bedrocks of burn care for decades. As time moves on, new challengers have come on to the market.

This brief talk will try to answer one question. “How should I use silver sulfadiazine in my practice?”
Establishing the Safety and Efficacy of ReCell™ as an Autograft Sparing Technology for Definitive Closure of Burn Injuries

JAMES HOLMES | MD

Background: Split-thickness skin grafts (STSG) are standard care for the treatment of deep partial-thickness and full-thickness burn injuries. Although effective in achieving rapid and permanent closure of the burn injury, the donor site wound created during autograft harvest is often more troublesome for patients than the primary injury, as these wounds are a source of significant pain and are at a risk for infection, discoloration, and scarring.

The RECELL® Autologous Cell Harvesting Device is a point-of-care, autograft-sparing technology that offers an alternative strategy to standard autografting. The device enables a clinician to process a small STSG sample into a non-cultured, autologous skin cell suspension (ASCS) for immediate application to the burn wound to achieve definitive closure. This technique allows for expansion of up to 80 times the area of STSG donor skin harvested, thereby minimizing the donor site wound created while maximizing wound coverage.

Methods: Two pivotal, prospective, randomized, within-patient controlled clinical trials were conducted under a US FDA Investigational Device Exemption (NCT01138917 and NCT02380612) evaluating the safety and effectiveness of ReCell™ in the treatment of acute thermal burn injuries in a total of 131 subjects. The first trial evaluated 101 subjects at 12 clinical sites and investigated the effect of ASCS used as a primary intervention for the treatment of deep-partial thickness injuries compared to treatment with a 2:1 meshed STSG. The second pivotal trial evaluated the use of ASCS as an adjunct to widely meshed STSG for the treatment of mixed depth burns, inclusive of full-thickness, compared to less widely meshed STSG in 30 subjects from 6 clinical sites. In these trials, the incidence of wound closure, donor site requirements, donor site healing, long-term scar and satisfaction outcomes, and adverse events were evaluated over 52 weeks.

Results: Collectively, the data from these 2 clinical trials demonstrate that the use of ASCS, either as a primary treatment or as an adjunct intervention to widely meshed STSG, significantly reduces the amount of donor skin required to achieve definitive closure, as compared to control-treated burn wounds, without compromising the quality of healing or long-term outcomes.

In the first pivotal trial (n=101), co-primary endpoints for the incidence of recipient site wound closure and donor site wound healing were established for deep-partial thickness burns treated with ASCS vs. 2:1 meshed STSG. The proportion of subjects with recipient site wound healing at 4 weeks was 98% for ASCS-treated and 100% for control STG-treated burns. Non-inferiority was established for the incidence of recipient site wound closure, as the lower bound of the 95% CI for the difference of the proportions between the ASCS and control treatments was greater than the pre-defined -10% non-inferiority margin. Superiority was achieved for donor site wound healing as a significantly greater proportion of the donor sites harvested to prepare ASCS were healed at one week compared to donor sites harvested for conventional STSG (p<0.05). A significant difference was also seen at week 2, with 90% of the ASCS donor sites being healed as compared to 67% of the control donor sites (p<0.001). Additionally, the donor sites harvested to prepare ASCS were significantly smaller (p<0.001), were significantly less painful at weeks 1 - 8 (p<0.001), had significantly improved long-term appearance as assessed by the patient at week 52 (p=0.0018), and were associated with significantly improved scar outcomes as assessed by the investigator at week 52 (p=0.0025). The use of ASCS did not introduce any safety risks, as all adverse events were consistent with a patient population undergoing autografting for the treatment of burn injuries.

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Continued... Establishing the Safety and Efficacy of ReCell™ as an Autograft Sparing Technology for Definitive Closure of Burn Injuries

JAMES HOLMES | MD

In the second pivotal trial (n=30), co-primary endpoints for the incidence of recipient site wound closure by 8 weeks and the comparison of expansion ratios were established for mixed depth burns treated with ASCS in conjunction with a widely meshed STSG as compared to conventionally meshed STSG alone. The proportion of subjects with recipient site wound closure by 8 weeks, as assessed by a blinded evaluator, was 92% for ASCS-treated and 85% for control STSG-treated burn wounds. Non-inferiority was established for the incidence of recipient site wound closure, as the upper bound of the 97.5% CI for the difference of the proportions between the ASCS and control treatments was less than the pre-defined 10% non-inferiority margin. Superiority was achieved for the relative reduction in donor area requirements, calculated as the ratio of measured treatment area to measured donor area. The average reduction for ASCS-treated sites compared to control-treated sites was 32% (p<0.001). Furthermore, comparable long-term patient satisfaction, scar outcomes, and safety profiles were observed over the 52-week study.

Conclusion: These data establish the safety and effectiveness of the RECELL® device as an autograft-sparing technology indicated for use at the patient’s point-of-care for preparation of ASCS in treating acute thermal burn injuries. When used as a primary treatment for deep partial-thickness burns or as an adjunct to widely meshed STSG for full-thickness burns, ASCS-treated wounds achieve epidermal regeneration using significantly less donor skin with comparable healing and long-term outcomes to conventional STSG. These findings have potential implications for a paradigm shift in the approach used to achieve rapid and permanent closure of burn injuries. Furthermore, achieving definitive closure using less skin compared to standard autografting has the potential to decrease the number of surgical procedures required to achieve wound closure as well as reducing hospital length of stay, thus decreasing the overall costs related to the treatment of burn injuries.
Evaluation of Intubation Criteria in Facial Burns and Inhalation Injuries

SARAH LARSON | MS3

Introduction: According to the Advanced Burn Life Support (ABLS) guidelines, patients with facial burns and suspected inhalation injuries are required to be intubated. Yet many patients are extubated within 48hrs, indicating intubation may be unnecessary and previous studies have shown rates up to 40%. The objective of this study was to evaluate the prehospital intubation practices with their outcomes in facial burn and inhalation injuries.

Methods: This study is a retrospective review of admitted patients with facial burns or inhalation injuries with patient intubation. Data was collected via ICD9, ICD10 codes and chart review over a 2 year period evaluating length of intubation time. Data included basic demographics, burn injury type, %TBSA, presence of inhalation injury, intubation time, hospital length of stay (hLOS). Patients who had died were excluded.

Results: Between 2016 and 2017 a total 427 patients followed our inclusion criteria, with an avg TBSA 14.6%; in addition, there were 230 patients with zero ventilator days (avg TBSA 7.2%).

For the intubation time, 15.7% were extubated at 24hrs (avg TBSA 4.4%), 30.0% by 48hrs (avg TBSA 6.4%) and 54.3% >48hrs (avg TBSA 17.2%). In exploring this relative to the hLOS, we found an avg 3.3 days/ pt extubated at 24hrs, 4.7 days/ pt extubated at 48hrs and 30.1 days/ pt extubated >48 hrs; of these, only 24.3% patients had an inhalation injury (avg TBSA 12.19%; avg 12.3 hLOS/pt).

Conclusions: In study, utilizing extubation at 48hrs as the marker for unnecessary intubation we get 45.7% of patients, similar to the 40% rate in the literature. In addition, only a quarter of our patient pool had an inhalation injury.

To more accurately identify patients who will benefit from emergent airway support, a reevaluation of the current criteria for prehospital intubation is warranted.
Successful Combination of Spray Keratinocytes and Cultured Epithelial Autografts: A Multimodal Approach to Early Wound Closure in Large Burns.

LEIGH SPERA | MD | *DAVID BEESINGER SCHOLARSHIP WINNER

Purpose: Closure of large total body surface area (TBSA) burn wounds remains a challenge to the burn surgeon. Limited availability of donor sites for autografting can prolong the amount of time and number of surgeries in order to obtain complete wound closure. In our burn center, we have had a successful experience with combining cultures epithelial autograft (CEA) and spray keratinocyte (SK) technology, which has recently obtained FDA—approval for adult patients, to obtain a more expeditious definitive coverage of large TBSA burns.

Methods: This is an ongoing prospective outcomes study evaluating SK as an adjunctive therapy with CEA in the treatment of patients who lack adequate donor sites for conventional grafting. Following resuscitation and excisional debridement, SK was applied in combination with widely meshed split—thickness skin grafts (STSG) to posterior body areas and CEA to anterior body areas. Clinical outcome data was subsequently collected.

Results: Five patients, 8 to 61.8 years of age, were treated with the combination of CEA and SK in addition to traditional STSG. TBSA ranged from 52%—95% (mean=68.4%). CEA take averaged 78.75% and SK re—epithelialization averaged 94%. Two additional pediatric patients with mean TBSA of 46.5% were treated solely with SK and did not require CEA for additional wound closure. There were no mortalities.

Conclusion: In our practice, the use of CEA and SK in combination with STSG has allowed for earlier wound closure and return to a homeostatic state. This also translates to a shorter length of stay in some of our patients. This multi—modal approach should be considered within surgical algorithms for large TBSA injuries as it allows for greater wound coverage amongst patients with smaller available donor sites.
Can the Burn Therapist Have a Role in the Opioid Crisis

MARGARET SEILER STOLPEN | OT

Purpose: To examine the overall role of physical therapy in the burn/trauma setting and evaluate how our expertise may reduce opioid use in the long term.

Background: Increased use of opioids to treat acute and chronic pain is well documented in the literature. Various media outlets have exposed the public to tragic stories of families ravaged by addiction, loss of employment, depression, overdose and loss of life. An estimated 20% of patients who see their physicians for noncancer pain related symptoms leave their office with an opioid prescription. Primary care providers' account for almost half of all opioid prescriptions dispensed. These prescriptions increased 7.3% per capita from 2007 to 2012. The Drug Abuse Warning Network indicates >420,000 ER visits due to misuse or abuse of pain relievers in 2011 the most recent report made available and from 1999 to 2014 more than 165,000 people died from overdose related to opioid pain medication.

To address this ongoing crisis in the USA the CDC released guidelines for prescribing opioids for chronic pain in 2016. Guidelines were recommended based on scientific evidence, expert opinion, public & stakeholder input. One of the non-opioid recommendations includes Physical Therapy. The American Physical Therapy Associations' opioid awareness campaign: #Choose PT states that therapy has an important role to play in the battle against opioid addiction.

Methods: In the acute burn trauma setting physical therapy is initiated upon admission. A discussion of the general therapy plan consisting of positioning, ROM/exercise and progressive mobility occurs on a daily basis. Due to the type of injury pain medication is routinely utilized for dressing changes and therapy activity. Long term complications may occur due to tendon/muscle shortening, skin tightness and scar band formation. These issues may occur for a variety of reasons: delayed therapy intervention due to medical complications, noncompliance of a properly implemented program and lack of patient support systems and appropriate follow up once discharged.

Discussion: Physical Therapy has an important role to play in the opioid discussion in that we are seen as the experts with regard to motion. The CDC recommends that therapy be included in a multi-pronged effort to not only reduce long term opioid use but avoid it's use altogether in some instances. In the burn community we are uniquely positioned in that we already function as part of a multidisciplinary team and can impact the long term results if we focus on activities that not only prevent long term complications but can also teach the patient alternative movement patterns, body mechanics, postural exercises, strengthening and encourage activities that promote wellness.
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E-Cigarette Burn > 60 Cases

PHILLIP FIDLER | MD FACS

Over 60 cases of E-cigarette burns are reviewed for injury severity, management and follow up.
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A Practical Approach to the Use of Skin Substitutes for the Solo Practitioner

TODD ZUHLKE | MD

Background: The reconstructive ladder has provided an outline and hierarchy of options. While reconstruction may proceed in a stepwise fashion, this is not absolute, suggesting the new paradigm of the reconstructive elevator. In this analogy an option that is commiseratively appropriate to the severity and specific characteristics of the wound is chosen from the continuum initially.

With progression of biocompatible synthetic, prepared, engineered, and prefabricated options new floor stops on the elevator have become available.

The first skin substitute, an absorbent dressing made of cotton wool sandwiched between layers of gauze, was attributed to Joseph Gamgee in 1880. Since that time epidermal layer substitutes have progressed to synthetic membranes, approximating important features of the epidermis, basement membrane, and dermis. Advantages of a synthetic membranes include virtual endless supply and a potentially reduced cost profile. Disadvantages include presence of a foreign body until completely incorporated or degraded, variable reliability, and that a regenerative potential of the underlying wound is a prerequisite to wound healing.

Another class of wound covering is the dermal repair/regenerative scaffold, which may be a constructed composite of biologic materials or processed and changed from the donor source. The goal is to provide an application with local delivery of a chemical and nanostructure environment conducive to healing and regeneration. Current investigation includes extracellular matrix-like structures, stem cells, and growth factors stimulating fibroblast ingrowth, neovascularization, cell proliferation and differentiation, with redeposition of ground substance, extracellular matrix, dermal components, and remodeling.

The advent of these materials have augmented available tools for wound closure and reconstruction and provided an additional option in patients that may have a contraindication for autologous tissue transfer.

Case Presentation:

Presented are various case examples.

Conclusion:

Skin substitutes represent another reconstructive option, facilitating a greater tailored approaches to wound treatment, reconstruction, and healing. However, reliability, efficacy, and cost must also be considered.
Abstracts

The Concept of Pediatric Second Degree Burn Care

SIGRID BLOME-EBERWEIN | MD

Most pediatric burns will heal without skin grafting. In fact, most pediatric burns are treated with dressing changes and close follow up, once discharged, or even outpatient. Over time, many dressing materials and wound coverage have been tried and studied. There are strong and conflicting opinions about the best dressing to treat pediatric second degree burns amongst providers. Evidence based information is available on most commonly used dressings. Over time we have used various FDA approved and/or registered materials in our burn center and have reached the following conclusion:

The best dressing is the one you don’t have to do! It is cheapest, has no pain, stays clean, prevents the wound from drying out, does not interrupt healing, can be monitored and stays in place.

Therefore we are discussing the “concept” of pediatric second degree burn care in this paper. It has been our experience, that no one dressing material fits every patient, wound or family.

The patient: Toddler or Teen?

The wound: Covered with blister skin or clean? Superficial or deep second degree?

The location: Ear or arm?

The living situation: The dog sleeps in bed. There is no running hot water.

The family resources: Kling and Gauze is not covered by insurance.

The comfort level with wound care: Home care or grandpa can help?

Assessing the situation under all those aspects renders a clearer picture of the individual concept for wound care and should dictate which concept is chosen.

1. The concept of daily dressing changes with creams: pro: daily cleansing, cheap for the Hospital Cons: pain, out of pocket expense, disturbs wound healing on daily basis

2. The concept of multiple day dressings: Pro: less pain, less daily dressing materials Cons: wound cannot easily be monitored; expensive initial dressing

3. The concept of once and done dressings: Pro: no or minimal pain, no or minimal out of pocket expense, does not disturb wound healing Con: expense initial dressing, may not be translucent, removal requires expertise

In our practice we try to match the individual with the most appropriate concept. We are presenting one individual for each concept:

1. 14y/o with small burn (2%) on face and neck and hand

2. 4 y/o with 20% TBSA burn to face, scalp, shoulder and trunk

3. 2 y/o with 22% TBSA to face, flank and arm
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Cultured Epidermal Autograft Use for Permanent Coverage of a Large Full Thickness Burn in a Pediatric Patient: A Case Report

DAWN CLOUTIER | BSN RN

Practice Gap: Large total body-surface area (TBSA) % full thickness burns are associated with hemodynamic instability, significant risk for infection, and lengthy hospital stays. The standard treatment for such burns is autografting; however, healthy autologous donor sites are often limited or in undesirable areas.1 This results in reharvesting of donor sites multiple times and many subsequent surgeries for autografting. Cultured epidermal autografts (CEA) provide a means to cover a large TBSA% quickly while maximizing the coverage of available donor skin.


Methods: A 5 year old male admitted to a verified pediatric burn center the day of injury after receiving initial care at local facilities. He presented with 65% TBSA (60% TBSA full thickness and 5% TBSA deep partial thickness) burns to his head, neck, anterior and posterior torso, bilateral upper extremities, and bilateral anterior thighs. Within 48 hours of admission, the patient underwent initial debridement with allograft application, and a full thickness specimen of non-burned skin was sent for CEA processing. On post-burn day (PBD) 28, the patient received an initial CEA application over 6:1 meshed autograft to cover 1500 cm2 including bilateral anterior thighs and upper anterior torso. On PBD 45, the patient underwent a second CEA grafting over 6:1 meshed autograft on bilateral upper extremities to cover 1500 cm2. On PBD 65, the patient had a third CEA grafting to his posterior torso, posterior neck, and bilateral shoulders to cover 1200 cm2. The wound bed had been prepared with allograft, which was well-engrafted with dermal components present in most areas. Areas without dermal components including bilateral flanks and right shoulder were grafted with 6:1 meshed autograft underneath CEA. On PBD 107, the patient a fourth CEA grafting to his bilateral upper extremities, anterior, and posterior torso to cover 1560 cm2 to cover any remaining unhealed areas. Removal of petrolatum gauze backings from CEA, or takedown, occurred at post-op day (POD) 9, 7, 11 and 11 respectively. Prior to takedown, the CEA-grafted areas were open to air at least four hours per day. Throughout treatment, the CEA-grafted areas were dressed in tobramycin wring-out dressings in response to wound cultures.

Results: Initial take rates of CEA were approximately 90% on anterior surfaces, 60% on bilateral upper extremities, and 30% on posterior torso. Take rates of the CEA after the fourth and final application were 60% to the bilateral upper arms and torso. Donor sites were harvested a total of three times, with no additional surgeries for autografting or reharvesting of donor sites.

Conclusions: Greater success of CEA on anterior surfaces could be attributed to fewer shearing forces and more exposure to air during drying time. Another factor in poor take rate on the posterior surface may be lack of 6:1 autograft underneath CEA grafts. Greater success could be realized with more aggressive off-loading of posterior grafts or the addition of 6:1 autograft underneath CEA. Early use of CEA allowed for expeditious closure of a large full-thickness burn with minimal harvesting of graft sites.
Evaluation of Outcomes Following Surgical Treatment of Hidradenitis Suppurativa

LUCY WIBBENMEYER | MD

Abstract Summary: Evaluation of outcomes following surgical treatment of hidradenitis suppurativa.

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Background. Hidradenitis suppurativa (HS) is a chronic disease of the apocrine bearing skin. In late stages, the patient is plagued with induration, pain, draining sinuses, and subcutaneous abscesses, impairing the patient’s quality of life (QOL). Full-thickness excision followed by skin grafting of involved skin is usually curative. Herein, we evaluated the outcomes of patients who underwent aggressive surgical treatment of this disease.

Methods. Patients 18 years and older who presented to the clinic for treatment of HS were approached. Subjects who consented filled out the dermatology quality of life (DQLI) and the patient health questionnaire (PHQ-9) at the time of consent and at one month and 6 months post initial evaluation and surgery. Demographics (age, gender, race, co-morbidities, psychiatric conditions, occupation, BMI); HS data (HS location, axillary laterality, Hurley stage); admission data (length of stay (LOS), number of admissions); and operative information were collected from the subjects’ medical records. Descriptive statistics were obtained using SPSS 25.0.

Results. Eighteen patients presenting with HS were enrolled. The average age was 43.3 ± 11.8. All subjects were overweight or obese (BMI = 41.7 ± 11.3). Subjects were mainly Caucasian (72.2%) and female (72.2%). Comorbidities included obesity (83.3%), hypertension (44%), depression (38.9%), anxiety (27.8%), respiratory disease (38.9%), smoking (38.9%), and diabetes (22%). Subjects presented with HS in the groin and perineum (55.6%), axilla (44.4%), breast (22.2%), buttock (11.1%), and trunk (11.1%). Half of the subjects presented with HS in 2 or more areas. At consent, the average DQLI score was 24.4 ± 9.2 ranging from 10 (low QOL) to 37 (good QOL) and that of the PHQ-9 was 10.5 ± 9.3 ranging from 0 (no depression) to 27 (severe depression). One month follow up was obtained from 9 patients (50%) and 6 patients at 6 months. Demographics were similar to those of the overall population. HS surgery was performed on the axilla (66.7%) or groin (33.3%). Comparison of the surveys filled out at consent, 1 month, and 6 months post-surgical treatment showed improved QOL post-surgery as noted by an increase in the average DQLI score from 21.1 ± 13.1 to 24 ± 8.9 at 1 month and 30 ± 10.63 at 6 months post-surgery. The PHQ-9 scores tended to increase from 9 ± 11.15 at consent to 10.8 ± 8.2 at 1 month follow up, but decreased to 5.8 ± 10.16 at 6 months follow up.

Conclusion. Despite a small sample size, our data show that aggressive surgical treatment that aims to remove all hair bearing areas of affected regions improves the QOL of HS patients. Further studies are warranted to confirm our findings.
Abstracts

Six Years of Laser Treatments for Scars at Lehigh Valley Health Network

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Introduction: Introduced in 1997 for the treatment of cutaneous lesions, lasers have been added to the armamentarium for the treatment of hypertrophic burn scars. Studies demonstrating the efficacy of laser treatments on scar appearance have been previously published. In 2015, our burn center published a prospective efficacy study about laser treatments that showed significant improvement. Since 2012, the burn center outpatient clinic has performed over 1,500 laser treatments. This number far exceeds any previous cases in studies exploring laser treatments. This is a preliminary collection of patients who have had at least one laser treatment between January 1, 2016 and May 1, 2018. The purpose of the study is to determine if laser treatments are a safe and effective treatment option for burn scars.

Methods: 187 patients with surnames of A-L who have had at least one laser treatment in the burn center outpatient clinic between 1/1/16 and 5/1/18 were analyzed. We looked at 868 laser treatments and collected variables such as pain, Vancouver Scar Scale, and complications in EPIC. The data was entered in REDCap. After finishing collection, the data was exported to Microsoft Excel, where statistical tests were performed.

Results: Patients who underwent laser treatments had an average TBSA (Total body surface area) of 14.2%, average treated scar size of 561 cm2, and 60% had skin grafts. 53.6% of patients used an ablative fractional laser for treatment, such as a CO2 laser, which had an average energy of 160mJ, average density of 111 spots/cm2, and average total energy of 5414J. 39.3% of patients used a non-ablative fractional laser for treatment, such as a mosaic laser, which had an average energy of 48mJ, average density of 295 spots/cm2, and average total energy of 2067J. Additionally, pediatric cases are more likely to use general anesthesia and therefore have a higher total number of anesthesia complications than adult cases. The overall drawbacks of laser treatments appear minor. The post-operative complication rate for laser treatments with and without general anesthesia is minimal, at 3% and 2% respectively. The most common post-operative complication for those under general anesthesia is prolonged recovery (>60 minutes). However, the median recovery time was 25 minutes, with prolonged recovery only occurring less than 2% of the time. This shows that laser treatments for scars in the outpatient setting are safe in all age groups and scar sizes. The pain during and after the procedure averaged at 3.9 and 1.5 respectively. Assuming the scar that will be treated is smaller in size, topical anesthesia is a good alternative to general anesthesia in smaller scars. Although Vancouver Scar Scale (VSS) showed modest improvement in scar appearance over time with a median improvement of 1, it is not a good way to determine the efficacy of scar treatments. The VSS is very subjective and easily prone to mistakes. As shown in previous studies, the VSS often does not correlate with objective measurements. Patient and Observer Scar Assessment Scale (POSAS) is not shown in the results because there were only 3 before and after samples available. Average improvement was 12 points out of 60 possible, representing great patient satisfaction with scar treatment.

Conclusion: This study, along with many others, has demonstrated that laser treatments are an effective method for improving burn scar appearance. The complication rate of laser treatments is low, and should not be a significant factor when assessing whether an individual should undergo laser treatments. In the future, the remaining records will be added to the database and patient interviews including all the POSAS 3 months after the final treatment will be documented.