Splinting and Positioning: Principles, Pearls and Problems

With overwhelming feedback and response from its members, the OT/PT SIG will present the principles, pearls, and problems of splinting and positioning that burn therapist's encounter in the acute care setting. Veteran burn therapists will share knowledge and experience of treating survivors during their inpatient hospital stay.

**Principles:** The importance of positioning and splinting during the acute care phases of healing. The history and evidence for the types of positioning devices and splints used by therapists in the burn center will be offered.

**Pearls:** Each presenter will present a case study describing a situation where the typical splints and positioning devices that we have at our disposal did not work. The presenter will illustrate what they creatively developed to solve the problem.

**Problems:** Therapists and nurses are sometimes at odds with splinting and positioning schedules. In a panel discussion, burn therapists and burn nurses will address issues that occurred at their burn center and how each discipline was able to work with one another so that the patient received the best care from both a medical management and best functional outcome perspective.
AGENDA

8:00 - 9:10  Welcome & Business Meeting
  1. Announcements
  2. MAC Update
  3. Abstract Manuscript Submission Updates
  4. Burntherapist.com update
  5. Barbara Knothe Burn Therapist Achievement Award
  6. Introduction of Topics and Speakers

9:15 – 10:00  Principles of Splinting and Positioning
  Ingrid S. Parry, MS, PT

10:00 - 10:15  Break – Refreshments provided by Bio Concepts, Inc.

10:15 – 11:15  Pearls in Splinting
  - Trudy Boulter, OTR/CHT
    Childrens Hospital Colorado, Denver, CO
  - Jennie McGillicuddy, OT
    UCSD Medical Center, San Diego, CA
  - Nora Barrett, OT/CHT
    MedStar Washington Hospital Center
  - Lori V. Turgeon PT, DPT
    Shriners Hospitals for Children, Boston, MA

11:30 – 12:00  Problems: a Panel Discussion
  - Derek Murray, MSPT
    Arizona Burn Center, Phoenix, AZ
  - Bonnie Blaney, RN
    Rhode Island Hospital, Providence, RI
  - Kari M. Gabehart, RN MSN FNP-BC
    Richard M. Fairbanks Burn Center, Indianapolis, IN
  - Amy Smith, MS, OTR/L
    Rhode Island Hospital, Providence, RI
  - Theresa Crawford, BSN RN
    Shriners Hospitals for Children, Boston, MA

12:15-12:45  Breakout sessions: Q & A with all presenters

12:45 - 1:00  Final Comments and Wrap-up
Rehabilitation Workshop

Tuesday March 25, 2014 3:30 PM – 5:30 PM

“Rehabilitation Outcomes: A Review of Standardized Metrics for Use in Clinical Practice”
Moderator: Bernadette Nedelec, PhD

During this workshop expert clinicians will review standardized instruments that are used in clinical care to assess rehabilitation outcomes. The focus of the review will be on metrics that assess hand function, mobility and global function. After a series of short lectures on these topics, there will be a break-out session to discuss practical issues of clinical implementation in a small group format.

Correlative Session Presentations

Wednesday, March 26, 2014, 10:00 AM -12:00 PM

33: A Prospective Randomized Controlled Trial Comparing Video Games to Standard Physical Therapy: Six Months Follow Up
Wednesday, Mar 26, 2014, 10:00 AM -10:15 AM
I. S. Parry, MS, PT, L. Painting, BS, A. Bagley, PhD (c), MPH, J. Kawada, BS, S. Sen, MD, FACS, D. G. Greenhalgh, MD, FACS, T. L. Palmieri, MD, FACS, FCCM
Shriners Hospitals for Children - Northern California, Sacramento, CA

36: Cutaneous Functional Unit is a Better Index than Total Body Surface Area Related to Burn Patient Outcomes
Wednesday, Mar 26, 2014, 10:45 AM -11:00 AM
U.S. Army Institute of Surgical Research, Fort Sam Houston, TX; University of Utah, Salt Lake City, UT; Shriners Hospitals for Children, Galveston, TX; Maricopa Health Systems, Phoenix, AZ; University of Iowa, Iowa City, IA

38: Gait Outcome of Pediatric Lower Extremity Amputation Patients with and without Skin Grafts
Wednesday, Mar 26, 2014, 11:15 AM -11:30 AM
I. S. Parry, MS, PT, A. Bagley, PhD (c), MPH, S. Sen, MD, FACS, D. G. Greenhalgh, MD, FACS, T. L. Palmieri, MD, FACS, FCCM
Shriners Hospitals for Children - Northern California, Sacramento, CA

Friday March 28, 2014, 10:00 AM – 12:00 PM

105: The "Wattage Wheel": Innovation in Practice for Burn Prevention
Friday, Mar 28, 2014, 10:30 AM -10:45 AM
A. Files, BSN,RN, M. L. Yelvington, MS OTR/L, S. Brown, CCRN, J. Williams, BSN,RN
Arkansas Children's Hospital, Little Rock, AR

107: Microwave Prepared Food: Assessing the Burn Risk
Friday, Mar 28, 2014, 11:00 AM -11:15 AM
M. L. Yelvington, MS OTR/L, A. Files, BSN,RN, S. Brown, CCRN
Arkansas Children's Hospital, Little Rock, AR
Poster Presentations

**Wednesday March 26, 2014 12:30 PM - 1:30 PM**

181: Insurance Status and Follow-Up after Burn Injury: Barriers to Access  
M. M. Magdziak, PT, A. O’Connor, MSN, CNP, L. Meyrick, BSN,RN, M. Robinson, OTR/L, D. Musgrove, None, L. J. Gottlieb, MD, FACS  
University of Chicago Medical Center, Chicago, IL

205: Custom-Made Oral Microstomia Orthosis: A Cost-Effective Alternative for Burn Therapists  
C. Whitehead, PT, M. A. Serghiou, OTR, MBA, D. N. Herndon, MD, FACS  
Shriners Hospitals for Children, Galveston, TX

206: FLEX Foot/Ankle Orthosis Application during the Acute Phase of Burn Rehabilitation: A Case Study  
J. Piro, OTR/L, M. A. Serghiou, OTR, MBA, C. Whitehead, PT, D. N. Herndon, MD, FACS  
Shriners Hospitals for Children, Galveston, TX

**Thursday, March 27, 2014, 12:30 PM - 1:30 PM**

271: Early Mobilization Practices in Adult Burn ICUs  
P. A. Tufaro, OTR/L, H. Hunter, PT, R. W. Yurt, MD, FACS  
New York Presbyterian Hospital/Weill Cornell Medical Center, New York, NY

272: Hierarchical Decomposition of Burn Diagram Based on Cutaneous Functional Units and its Utility  
R. L. Richard, PT, MS, J. A. Jones, BS, P. Parshley, BS  
U.S. Army Institute of Surgical Research, Fort Sam Houston, TX; SageDiagram, LLC, Portland, OR

275: Effect of a Six Week Supervised Exercise Program on Lower Extremity Functional Parameters in Burned Children  
C. Osborne, OTR, L. Ramirez, MD, C. R. Andersen, MS, D. N. Herndon, MD, FACS, O. E. Suman, PhD  
University of Texas Medical Branch, Galveston, TX
Special Interest Group

Background

Special Interest Groups (SIGs) originated out of the expressed need of the ABA membership to have small, informal groups in which to link with others with similar interests in an effort to exchange ideas, network with colleagues, share information and problem-solve. As the ABA grew, so did the number of SIGs. By 2003, there were 18 SIGs ranging in size from 10 to over 300 individuals attending various SIG meetings in conjunction with the ABA Annual Meeting.

The Special Interest Groups (SIG) hold meetings in conjunction with the Annual Meeting of the ABA. These meetings provide an opportunity for exchange of ideas, networking with colleagues, and information sharing. All ABA meeting participants are encouraged to attend these meetings, which are scheduled at times that do not conflict with the general meeting. These meetings are open to both members and nonmembers of the ABA.

Physical Therapy / Occupational Therapy (PT/OT)

This SIG provides opportunities for professional exchange of ideas, with colleagues on new treatment methods, research activity and clinical problem solving. Another focus is to encourage burn therapist involvement in the ABA. We have recently instituted a three year plan with two Co-Chairs to ensure continuity and consistency.

2014 Chair: David Lorello, PT, DPT
2014 Co-Chair: Lynne Benavides, OTR/L, CHT
2014 Co-Chair: Andria N. Agraz, PTA, CLT

Committees

Membership Advisory Committee
The Membership Advisory Committee (MAC) committee is comprised of dedicated non-physician burn care professionals who serve the ABA in a variety of ways. It is the responsibility of all MAC members to facilitate the appropriate expression of concerns, questions, issues, needs and recommendations that the At-Large Members wish to bring before the Board of Trustees. Members of the MAC Committee attend each of the SIG meetings at the annual meeting in order to disseminate information regarding the ABA activities and general ABA information and opportunities.

Dana Y. Nakamura, BS, OTR/L, CLT, CLMC
Sara E. Bills, DPT
Ingrid S. Parry, MS, PT, Ex Officio
Michael A. Serghiou, OTR, MBA, Ex Officio
**Additional 2013-2014 Committees with Therapist Membership**

**Archives Committee**
Reginald L. Richard, PT, MS  
Ingrid S. Parry, MS, PT  

**Burn Prevention Committee**
Colleen E. Macner, PT, DPT  

**Bylaws Committee**
Michael A. Serghiou, OTR, MBA  

**Conflict of Interest Committee**
Michael A. Serghiou, OTR, MBA  

**Ethical Issues Committee**
Patricia A. Sharp, OTR/L  

**Exhibitor Advisory Committee**
Johnathan Niszczak, MS, OTR/L  

**International Outreach Committee**
Tracy Gaboury, BS, OTR/L  

**Program Committee**
Michael A. Serghiou, OTR, MBA, Ex Officio  

**Rehabilitation Committee**
Bernadette Nedelec, PhD, BSc, OT, Chair  
Ingrid S. Parry, MS, PT, Vice Chair  
Lisa Forbes-Duchart, OT, MS  
Melinda Shetler, OTR/L  
Shu-Chuan Chen Hsu, OTR/CHT  
David J. Lorello, DPT  
Lynne Benavides, BS, OT  
Annick Chouinard, PT, BS  
Rachel Shon, MOT  

**Research Committee**
Lan Van-Buendia, MS, OTR/L  

**Verification Committee**
Ingrid S. Parry, MS, PT, Ad Hoc
New Logo! New Look! New Details!

The **BurnTherapist.com** web site – is the first site dedicated to the work and endeavors of Burn Occupational & Physical Therapists in an effort to develop outcome based research and clinical improvements for all burn survivors. We are committed to fostering collaborative networking relationships among burn therapists as well as developing clinical research, treatment innovations and improvement in service delivery and care at local, national and international levels.

We also highlight the achievements of Burn Occupational & Physical Therapists as part of the American Burn Association's Occupational & Physical Therapist Special Interest Group through the yearly **Barbara Knothe Burn Therapist Achievement Award**. We are a resource for therapist driven research and collaboration to provide the best treatment outcomes for the patients that we serve.

**Burn Clinical Pearls (formerly Splinting Quarterly)**

Each Quarter (January, April, July & October) we will highlight a splinting endeavor that has been created to work with a challenging surgical intervention or as a result of a unique patient need or request. New designs as well as modifications to an existing, established design are welcomed. Post-operative splints as well as adaptive device splints, casting and any other type of ADL modification gladly are welcome. We will also be archiving all of the submissions so that we can maintain a resource of burn splinting knowledge. Contribute to the accumulated knowledge and submit your splint design to today!

Go to the web site [www.BurnTherapist.com](http://www.BurnTherapist.com) and get involved!
Cheryl A. Hanley, OTR/L

Cheryl A. Hanley, OTR/L has been an Occupational Therapist for over 35 years and she has been practicing in burns for over 20 years. She began her burn career as the coordinator of Occupational Therapy at the Oakland Children’s Hospital and has spent the last 17 years as Supervisor of Occupational and Physical Therapy at the Shriner’s Hospital for Children in Northern California. In addition to her full time role, she also has served as adjunct faculty at Samuel Merit Collage in the Occupational Therapy Department and volunteered on multiple pediatric burn missions to developing countries. Most recently, Cheryl has been appointed to the Board of Directors at the Alisa Ann Ruch Burn Foundation where she has made her mark as volunteer, liaison, counselor and support staff for this pediatric burn camp. She has been active member of both the American Occupational Therapy Association for over 35 years and the American Burn Association for over 20 years and has achieved the advanced practice certification in both swallowing and hand therapy disciplines.

Cheryl Hanley may not be a name that is immediately familiar to all, primarily because she does not put herself center stage in presentations, publications or other notable roles of recognition. However, for over 20 years, she has been a vital “behind the scenes” supporter of the crucial work that moves burn rehabilitation ahead. Cheryl is a hands-on leader. She was instrumental in the development of a new burn unit ICU/ rehab division at her hospital early in her career and as manager has continued to shepherd the development and successes of her entire rehabilitation team. She champions ongoing clinical education, supports department development projects and important burn rehabilitation research in a time when financial resources are often lessened for such programs. She is creative in her approach to advocating for her department and always puts Physical and Occupational Therapy staff as a priority more often than not, sacrificing her ability to participate so that her team and burns are never left without.

Providing therapy is not enough for her, Cheryl continues to work above and beyond to support the families in whatever way is needed throughout the recovery process. She plays a very active role in the reintegration of the patient to both school and society and continues to maintain close contacts with many of her patients through years of burn camp involvement. As Cheryl progressed into a supervisory position, her core essence as the backbone of the department really shone. She encouraged therapists to achieve whatever they set their mind or heart to and helped them to carve the way for success and flourish in their careers.

Support is something that is often under-recognized in success. Behind every successful person, there is a support system that has made their achievements possible. Cheryl is one such unique support individual. She has been the inner foundation of the rehabilitation department at her hospital which has emboldened many therapists over the years to move burn research, education and clinical care forward and she fully exemplifies the spirit of this award with her humble leadership and amazing, unyielding support of the burn patient and burn therapy community as a whole.
2014 OT/PT SIG Committee

David Lorello, PT, DPT is a physical therapist who has been a member of the burn rehab team at the Arizona Burn Center since 2005. He has spoken about the rehabilitative needs of the burn survivor at multiple conferences including the Combined Sections Meeting of the American Physical Therapy Association (2009 – 2012), the Western Region Burn Conference (2009), the American Burn Association (2007) and the Arizona Burn Symposium (2006-2011). In the fall of 2012, David joined the faculty of the Program in Physical Therapy at Midwestern University in Arizona. David has been serving as a Chair for the PT/OT Special Interest Group since 2011, and serves on the Rehabilitation Committee.

Lynne Benavides, OTR/L, CHT received her degree in Occupational Therapy in 1990 from Quinnipiac College. She became a Certified Hand Therapist in 2002. Lynne has worked at Rhode Island hospital for 24 years and joined the burn team at the onset of her career. She worked in the acute care setting for 10 yrs and in the out patient setting for the past 14 years. She has been involved in 2 International outreach missions for burn care and has presented at many multidisciplinary conferences including the Northeast Regional Burn Conference and at the New England Hand Society annual meeting. She is thrilled to be able to be a part of the OT/PT SIG.

Lynne also enjoys living near the ocean in southern RI, and spending her time with her husband and children, exercising outdoors and especially watching her kids swim!

Andria N. Agraz, PTA, CLT is a Physical Therapist Assistant and Certified Lymphedema Therapist and has been a member of the Richard M. Fairbanks burn rehab team since 2009. Andria has worked in the areas of acute care and outpatient therapy and has been on 2 mission trips to El Salvador to promote and educate burn care and burn therapy. She is a member of the American Burn Association and really enjoys the time spent at conferences learning about new ideas and meeting the clinicians that make burn care so special. Andria has given several guest lectures to the University of Indianapolis PTA program in the area of Lymphedema and assists with the burn therapy lectures as well. In her free time she spends most days with her family and reading wherever she can find a comfy spot. She is excited to be a part of the OT/PT Special Interest Group and is honored to have been chosen as co-chair.
Ingrid S. Parry, MS, PT received her BS in kinesiology from the University of Colorado, Boulder, Colorado and her MS in physical therapy from Duke University, North Carolina, USA. She has worked in burn care for 19 years, 17 of which have been with Shriners Hospital for Children, Northern California doing clinical care and rehabilitation research. She has served on multiple American Burn Association Committees and the ABA Board of Trustees. Ingrid lectures on burn care and rehabilitation at 3 major universities and has mentored numerous students. She has presented multiple abstracts at national and international conferences and published peer-reviewed articles in Journal of Burn Care & Research and Burns. Her current studies focus on the use of commercially available interactive video games in burn rehabilitation, burn therapist competency development and the management of facial scarring.

Trudy Boulter, OTR/CHT is a Certified Hand Therapist and Advanced Practitioner specializing in Upper Extremity trauma, burn injuries and congenital differences. In addition to specialized clinical care at Children’s Hospital Colorado, she is the Director of Children’s Hospital Colorado Burn Camps Program, a specialized program to meet the emotional and physical challenges children often experience following a traumatic burn injury. Trudy is an active member of the American Burn Association, the American Camping Association and The American Society of Hand Therapists. Outside of work, Trudy enjoys her family, friends, skiing, biking, running, traveling….all things fun!

Jennie McGillicuddy, OT lives in San Diego, California but is originally from Louisiana. She completed her undergraduate degree and graduate training at Louisiana State University. She currently works at UCSD Medical Center; primarily in the Burn Unit. She enjoys the challenges that each day presents when treating those individuals with serious burns. Jennie enjoys running, cooking, hiking, yoga, and reading.
Nora Barrett, OT/CHT is the Clinic Coordinator of the Outpatient Center for Orthopedic Rehab at MedStar National Rehabilitation Hospital and a burn therapist at MedStar Washington Hospital Center in Washington, DC. She graduated from Washington University in St. Louis, MO in 1997 and has since worked in rehab (Spaulding Rehabilitation Hospital, Boston, MA), acute care (Brigham & Women’s Hospital, Boston, MA) and outpatient settings (National Rehab Hospital Regional Rehab, Washington, DC and Curtis National Hand Center, Lutherville, MD) with a focused clinical practice in hand therapy and burn injury/wounds since 2004. In 2006 she completed the Advanced Certification in Hand & Upper Quarter Rehab at Drexel University in Philadelphia, PA. She serves on the Education Division and the Annual Meeting Committee for the American Society of Hand Therapists and is a member of the American Burn Association. She enjoys lecturing at universities in the northeast region and presenting topics in burn and UE injuries at conferences across the country. Nora loves to travel, root on the Chicago Cubs and Indiana Hoosiers, run half marathons, and spend any free time outdoors!

Lori V. Turgeon PT, DPT In 2004, Lori received her Master’s degree in Physical Therapy from Northeastern University. She worked in Early Intervention for two years, strengthening her treatment skills with a focus on development and treatment of pediatric neurological and congenital conditions. In 2006, Lori joined the team at Shriners Hospitals for Children- Boston, uniting her love of pediatrics with a passion for burn care and acute rehabilitation. Lori has since completed her Doctorate of Physical Therapy in 2010 from Northeastern University. Lori is an active participant in the current expansion into orthopedic services offered by Shriners Hospitals for Children- Boston, assisting in planning, assessing equipment needs, training of staff, and treating orthopedic patients.

Lori is a strong believer in the need for ongoing education. She is a member of the Clinical Advancement Board, promoting the continuing education and advancement of clinical staff within their profession and the hospital as a whole. Lori is also active in education of physical therapists, regularly lecturing at area universities on the treatment of patients with burn injuries.

Lori enjoys living in the suburbs of Boston, MA with her husband, two young boys, and their chocolate lab.
Derek Murray, MSPT graduated from the University of Alabama-Birmingham’s Physical Therapy program in 1997 with his Master’s Degree, after earning a Baccalaureate Degree in Business Administration from Northern Arizona University. He has practiced Physical Therapy at the Arizona Burn Center since 2002, and been the Supervisor of Burn Rehabilitation since 2003. Derek has spoken at multiple annual Arizona Burn Symposiums, developed burn rehabilitation material for presentation at the American Physical Therapy Association’s Combined Sections Meeting (2012), and presented at the Western Regional Burn Conference (2013). Derek was a member of the American Burn Association’s Functional Outcomes Committee in 2012.

Bonnie Blaney, RN graduated from University of Massachusetts with a Bachelor degree in Nursing in 1993. She began as a surgical nurse at Rhode Island Hospital in 1993. In 1996 she transferred to the new Trauma/Burn ICU at Rhode Island Hospital. From 1998 to 2000 she was the Burn Nurse Coordinator for Rhode Island Hospital and Hasbro Hospital; coordinating the care of adult and pediatric inpatients and outpatients. In 2010 she traveled to Costa Rica with the Affiliates of Burn Care, helping to educate medical staff there on the care of burn patients. She has spoken at the Peter D. Smith Seminar, and the Rhode Island Hospital Burn Conference. She currently works on the Trauma/Burn ICU as a staff nurse, and preceptor. She is an ABLS instructor and currently presiding as Secretary on the newly formed Rhode Island Burn Federation.

Kari M. Gabehart, RN MSN FNP-BC is a Nurse Practitioner and Nursing Director at the Richard M. Fairbanks Burn Center in Indianapolis, IN. She began her career in the burn center as a student nurse in 1994 and has remained in the burn center for 20 years working in many professional roles such as Burn Educator, Clinical Nurse and Inpatient Nurse Practitioner before taking on the Nursing Director role. Kari is a member of the American Burn Association and strives to educate others on burn care, burn prevention and fire safety. She has been on 6 medical mission trips to El Salvador assisting with the education of nurses and clinicians to build a quality burn program and regularly participates in professional speaking events around the Indianapolis community to promote burn safety and care not only to the public but outlying care facilities. She is a dedicated member of the Richard M. Fairbanks burn team and continues to lead and promote a multi-disciplinary team approach that welcomes new ideas and embraces a passion for excellent burn care.
Amy Smith, MS, OTR/L has been practicing in various rehabilitation settings for 16 years, working in acute care with adult burn survivors for the past 10 years. She has been a member of the American Burn Association for 6 years. Amy has participated in international burn care outreach. Presently, at the Rhode Island Burn Center at Rhode Island Hospital, Amy is a Senior Therapist with a passion for providing evidence based and comprehensive burn rehabilitation. Some of her special interests include splint fabrication and community reintegration. She is currently researching local burn survivors’ perceptions of psychosocial support and is active with support group and other burn survivor organizations. Amy has served on the Phoenix Society’s World Burn Congress and Rhode Island Hospital’s Rehabilitation Conference committees and presented at regional burn symposia. She is an adjunct faculty member in the Occupational Therapy Assistant Program at Bristol Community College. Amy loves opportunities to learn and spends the rest of her time enjoying her children, bulldog, music, and the great outdoors.

Theresa Crawford, BSN RN B is a Registered Nurse on the Acute Care Unit at Shriners Hospitals for Children in Boston, Massachusetts. She began her career at Shriners Hospitals for Children while in 2003, while studying nursing at Northeastern University and has remained on the Acute Unit for nearly 10 years. Theresa’s passion is pediatric burn care and she strives to promote education to others on burn prevention and burn care. She developed a burn prevention program for elementary school children and presented at local schools encouraging the children to participate in burn prevention games and activities as well as medical play, to promote safety and help prevent burn injuries. She also functions as an education representative for night shift staff on her unit and works as a CPR/BLS instructor for staff at Shriners. Theresa is excited to be participating in this year’s ABA conference.
Principles of Splinting and Positioning

by Ingrid S. Parry, MS, PT
POSITIONING AND SPLINTING DURING ACUTE REHABILITATION: THE PRINCIPLES

Ingrid Parry MS, PT
Shriners Hospital for Children

OBJECTIVES

• Cover the Basics
• Get you Thinking
• Review the Literature

Richard et al., 2009
POSITIONING AND SPLINTING

POSITIONING PROGRAMS

- Prevent Tissue Destruction
- Control Edema
- Prevent Deformity

OBJECTIVES OF POSITIONING PROGRAM
• Turning schedule
• “Lift and Shift” philosophy
• Pressure Relieving Devices
• Specialty beds
• Heels off beds
• Minimize rigid positioning
• Early mobilization
• Coordinated with other positioning goals

**PREVENT TISSUE DESTRUCTION**

• Tissue Destruction
• Delayed wound healing
• Calcification and increased bone density
• Compromised circulation
• Decreased ROM
• Poor joint position
• Insufficient lymphatic drainage

**EDEMA**

**Postburn edema of the upper extremity: Evaluation of present treatment.**  

• Intermittent compression significantly decreased edema in the first 72 hours post-burn
• Days 3-7 – elevation decreased edema
  • 8 hours of elevation
• Early decrease in edema does not correlate to function

**HAND EDema**
EDEMA MANAGEMENT

- Elevation
- Muscle pumping exercises (↓reps, ↑freq) (Howell, 1989)
- High Voltage Pulsed Current (Reed, 1988)
- Compressive wraps
- Increase active exercises and mobilization

UNDERSTANDING SCARS (in a nutshell)

DERMAL HEALING

- Deep Partial Thickness
- Full Thickness

Dermis does not Regenerate, it Repairs

Scar Formation
DERMAL HEALING

Wound
Regeneration DOES NOT occur in humans
Normal Scar
Hypertrophic Scar - only occurs in humans

Slide courtesy of Dr. Bernadette Nedelec, PhD

DERMAL HEALING

Paul Erlich, PhD

CUTANEOKINEMATICS

Mathematical Model to Estimate Change in Burn Scar Length Required for Joint Range of Motion

<table>
<thead>
<tr>
<th>Site</th>
<th>Length Change (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Axilla</td>
<td>16.56</td>
</tr>
<tr>
<td>Knee</td>
<td>11.25</td>
</tr>
<tr>
<td>Elbow</td>
<td>10.47</td>
</tr>
<tr>
<td>Ankle</td>
<td>2.94</td>
</tr>
<tr>
<td>Neck</td>
<td>2.02</td>
</tr>
<tr>
<td>Finger</td>
<td>.83</td>
</tr>
<tr>
<td>Wrist</td>
<td>.6</td>
</tr>
</tbody>
</table>

24
Directional Variance in Skin Movement Related to Burn Scars
Richard et al., JBCR 1999

- Directional bias of how the surrounding skin moves
- Distal movement 2.5 times greater than proximal

CUTANEOKINEMATICS

Identification of Cutaneous Functional Units (CFUs) Related to Burn Scar Contracture Development
Richard et al., JBCR 2009

- Skin needed for movement can be distant from the joint
- The quantity of skin recruitment correlates to joint movement.

CUTANEOKINEMATICS

<table>
<thead>
<tr>
<th>Ground Substance Changes</th>
<th>Normal Skin</th>
<th>Hypertrophic Scar</th>
<th>Mature Scar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hyaluronic Acid</td>
<td>41.5%</td>
<td>21.0%</td>
<td>18.5%</td>
</tr>
<tr>
<td>Dermatan Sulfate</td>
<td>54%</td>
<td>55.1%</td>
<td>70.5%</td>
</tr>
<tr>
<td>Chondroitin 4 Sulfate</td>
<td>4.5%</td>
<td>26.4%</td>
<td>8.5%</td>
</tr>
</tbody>
</table>

SCAR MAKE UP
Kischer CW, Shetlar MR, Shetlar CL, 1975
LOW LOAD, PROLONGED STRESS

→

TISSUE GROWTH

THE POINT....

• POSITIONING AND SPLINTING PROVIDE LOW LOAD, PROLONGED STRESS

THE POINT....

“POSITION OF COMFORT IS POSITION OF CONTRACTURE”
• Positioning plan based on the location of the burn
• Surrounding tissue
• Functional movement of the joint
• Patient tendencies toward active movement
• Surgical plan

THINK OUTSIDE OF THE DIAGRAM

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>N= 681</td>
<td>N=2559</td>
<td>N=22</td>
<td>N=985</td>
</tr>
<tr>
<td>28%</td>
<td>43%</td>
<td>50%</td>
<td>39%</td>
</tr>
</tbody>
</table>

INCIDENCE OF CONTRACTURE
Lester et al. JBCR 2013

- 4 positions, nonconsecutive days
- 60 subjects
- Paresthesia, pain and positional tolerance

Axilla Position Tolerance
Lester et al. 2013

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Axilla</td>
<td>Hand</td>
<td>Axilla</td>
</tr>
<tr>
<td>Hand</td>
<td>Axilla</td>
<td>Elbow</td>
</tr>
<tr>
<td>Elbow</td>
<td>Neck</td>
<td>Hand</td>
</tr>
<tr>
<td>Foot</td>
<td>Elbow</td>
<td>Knee</td>
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</tbody>
</table>
Percentage of Subjects with Complaint by Position

<table>
<thead>
<tr>
<th></th>
<th>N/T</th>
<th>Pain</th>
<th>Intolerance</th>
</tr>
</thead>
<tbody>
<tr>
<td>90</td>
<td>10%</td>
<td>27%</td>
<td>40%</td>
</tr>
<tr>
<td>130</td>
<td>37%*</td>
<td>33%</td>
<td>40%</td>
</tr>
<tr>
<td>OR</td>
<td>5.2</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>150</td>
<td>25%*</td>
<td>42%</td>
<td>42%</td>
</tr>
<tr>
<td>OR</td>
<td>3</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>170</td>
<td>30%*</td>
<td>68%*</td>
<td>83%*</td>
</tr>
<tr>
<td>OR</td>
<td>3.9</td>
<td>5.9</td>
<td>7.5</td>
</tr>
</tbody>
</table>

OR = odds ratio depicts odds of subjects experiencing numbness / tingling, pain, or intolerance at each position compared to 90 degrees of shoulder abduction.

* Chi square test: p < 0.01

Lester et al. 2013

AXILLA POSITION TOLERANCE

AXILLA POSITION PARASTHESIA/ PAIN

- Transient paresthesia in ALL positions
- Symptoms not consistent with BPS
- 130° - ulnar nerve
- 170° - ↑ pain

Lester et al. 2013

EMPHASIZE THE EXTREME TO ACHIEVE THE MEAN

- No strong evidence to support splinting
- Mechanical tension of splinting stimulates fibroblasts
- Need for research to demonstrate clinical efficacy of splinting

Axillary Burns: Extended Grafting and Early Splinting Prevents Contracture

- Initial decline in ROM (first 6 months)
- Outcome 12 months post discharge mean = 152 degrees
- 5/23 patients needed reconstruction
- Limited compliance
DURATION OF SPLINTING


<table>
<thead>
<tr>
<th>Time</th>
<th>0%</th>
<th>10%</th>
<th>25%</th>
<th>50%</th>
<th>75%</th>
<th>90%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 day</td>
<td>0.6</td>
<td>0.5</td>
<td>0.3</td>
<td>0.3</td>
<td>0.6</td>
<td>0.4</td>
<td>0.8</td>
</tr>
<tr>
<td>4 days</td>
<td>0.8</td>
<td>0.6</td>
<td>0.2</td>
<td>0.2</td>
<td>0.6</td>
<td>0.3</td>
<td>0.6</td>
</tr>
</tbody>
</table>

- Splints work to prevent contracture
- BUT only if worn 6 months or longer

WHEN TO INITIATE SPLINTING

- To Splint Or Not To Splint Past Philosophy and Present Practice.
  - Part I – J Burn Care Rehabil 1996;17:444 - 53
  - Part II – J Burn Care Rehabil 1997;18:64 - 71
WHEN TO INITIATE SPLINTING

Richard et al., 1997

<table>
<thead>
<tr>
<th></th>
<th>Past</th>
<th>Present</th>
</tr>
</thead>
<tbody>
<tr>
<td>Splint on Admission</td>
<td>61%</td>
<td>26%</td>
</tr>
<tr>
<td>Delay until ↓ROM</td>
<td>34%</td>
<td>40%</td>
</tr>
</tbody>
</table>

WHEN TO INITIATE SPLINTING


<table>
<thead>
<tr>
<th></th>
<th>SPT</th>
<th>DPT</th>
<th>FT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full ROM = preventative Always</td>
<td>86%</td>
<td>2%</td>
<td>92%</td>
</tr>
<tr>
<td>Never</td>
<td>15%</td>
<td>32%</td>
<td>44%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>SPT</th>
<th>DPT</th>
<th>FT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loss of ROM = therapeutic Always</td>
<td>14%</td>
<td>2%</td>
<td>9%</td>
</tr>
<tr>
<td>Never</td>
<td>4%</td>
<td>2%</td>
<td>96%</td>
</tr>
</tbody>
</table>

WHEN TO INITIATE SPLINTING

The Effect of Positioning Devices and Pressure Therapy on Outcome After Full-Thickness Burns of the Neck. Sharp et al. JBCR 2007

- ↑ obstacles to positioning = ↑ reconstruction

<table>
<thead>
<tr>
<th>Number of Obstacles</th>
<th>Percent of patients needing reconstruction</th>
</tr>
</thead>
<tbody>
<tr>
<td>One</td>
<td>61%</td>
</tr>
<tr>
<td>Two</td>
<td>94%</td>
</tr>
<tr>
<td>Three</td>
<td>100%</td>
</tr>
</tbody>
</table>

BARRIERS TO EARLY TREATMENT

- Delayed positioning of the neck after skin grafting results in earlier and more frequent reconstruction
“It is quite difficult to separate acute care from burn rehabilitation, because so many of the long-term burn effects are impacted by events that occur in the early post-injury period”

State of the Science

THANK YOU
PEARLS: THE SHOULDER
Splinting and Positioning the Shoulder

by Trudy Boulter, OTR/CHT
PEARLS:
THE SHOULDER
Splinting and positioning the shoulder

Trudy Boulter, OTR CHT
Children’s Hospital Colorado

The classic airplane splint
Goal is to provide sustained stretch to avoid axillary contractures. Often worn at nights with one or both axilla splinted.

What we hope to achieve...
What we often get...

What often happens...

- Thoracic flexion and scapular abduction will occur if there is not enough tissue length anteriorly to support this position.
- The position of comfort is the position of contracture... this is NOT chest expansion, External rotation, thoracic extension, UE flexion or abduction.
- Due to the freedom of movement of our shoulder girdle compensatory movements are available and employed.

Position in splints

- Shoulders in internal rotation, elevation and thoracic flexion.
- Limited contact between the splint and the tissue to be stretched.
- With the strength of the latissimus easy to “push” out of position of stretch.
Points to ponder:
- Can you stabilize the scapula and/or the humeral head?
- Are you getting maximal length of the skin?
- What is the tissue you hope to put on stretch?

Dressings for optimal foundation

Dressings to Support Position
Position UE in ER and scaption, shoulder depression, thoracic extension
Use dressing to support the humeral head and facilitate therapeutic position; dressings can be a dynamic assist
High 5 brace

The Hi-Five was developed to easily manage positioning of the shoulder joint complex. The Hi-Five orthosis can be easily and infinitely adjusted in abduction, adduction, external/internal rotation as well as flexion and extension of the shoulder.

Airplane Splints: Strapping is Critical

Tips for success:

- Make sure your splint is actually doing the work you are hoping for
- Consider how much skin length you are working towards and remember that you will only get the skin length desired with total contact of your splint
- Orthotics are most successful when they can be anchored or formed to the skeleton.
- More often than not one type of splint, one type of dressing and/or one exercise will not meet the needs of a multi-planar joint.
- Often patient non-compliance is really a problem we as therapists need to solve. If it is helping it is worn…
“WHEN YOU HAVE EXHAUSTED ALL POSSIBILITIES, REMEMBER THIS- YOU HAVEN'T”

THOMAS EDISON
MOUTH SPLINTING following Burn Injury

by Jennie McGillicuddy, OT
MOUTH SPLINTING following Burn Injury

Jennie Gilchrist McGillicuddy, OT
March 2014

The importance of mouth ROM

- Nutrition
- Speech/Communication
- Oral Hygiene
- Overall Quality of Life

Traditional Interventions

- Tongue Depressors
- Microstomia Prevention Appliance®

Barriers
- The MPA® is not commercially available anymore... (Horizontal stretch)
- Though research does exist showing use of MPA® and improved horizontal mouth ROM
- No commercially available devices for a circumferential stretch
- No commercially available devices for a vertical stretch
- Limited research for a circumferential or vertical splint in the burn world; research is limited to the orthodontic world
- Available devices are rigid and may not be used immediately post-operatively
- Inconsistent size of tongue depressors
- Inability to progress
- Cost (MPA®)
- Not disposable (MPA®)
Mouth Splints for a Horizontal Stretch
• Static
• Static Progressive
• Dynamic
• Padding options

Mouth Splints for a Vertical Stretch
• Static
• Static Progressive
• Option 1
• Option 2
• Padding options

Mouth Splints for a Circumferential Stretch
• Static
• Static Progressive
• Padding options
Mouth Splints and Children

- **AVAILABLE CAREGIVERS** due to choking hazard
- Options to prevent choking
  - Size & Supervision
- Padding options
- Age appropriate rewards & techniques
- Progression options (*No small parts*)
- Most success with circumferential mouth splints and children
- Take caution: teeth development, developing speech

---

Indications for Mouth Splints

- **Indication**: Decreased mouth ROM following facial burn

- **Benefits**:
  - Disposable
  - Cost effective
  - Clinic fabricated
  - Soft; May be utilized immediately post-operatively or at any stage of healing
  - Progression options available
  - May be used with children

- Note the skin integrity working with (i.e. day of surgery or 4 weeks out?)
- Identify available support system to monitor for skin breakdown
- Cognition in relation to splint compliance

Mouth splints have been found to be effective in improving mouth ROM (when used in addition to ROM exercises, scar massage, and pressure intervention with silicone masks).

---

Additional Interventions

- ROM exercise programs for all planes (Handouts; Progression Charts)
  - 3 sets daily
- Scar Massage
  - 4 twenty minute sessions daily
- Silicone lined pressure masks
Materials

MOUTH SPLINT PATTERNS
- Varies (Child versus Adult & Size of commissure)

- Thermoplastic material
- Goniometer
- Scissors
- Splint water pan & Heat gun
- Silicone or soft padding
- Devices to adjust the splints
- Straps (Options)
  - Determine starting point and progress accordingly.

Progression

- Based on
  - The location of the burn
  - The ROM progress of the patient
  - The comfort of the patient
  - Splint use began with 15 minutes twice daily and was increased to 30 minutes twice daily with each splint, depending on patient tolerance\(^2\) (2013 ABA Poster Presentation)
  - Usually static \(\rightarrow\) static progressive \(\rightarrow\) dynamic

  - Experiment with options!

Precautions/Contraindications

- Pain
- Age <2 years old\(^*\)
- Cognitive status
- Absent or limited support system
- Non-healing grafts or flaps around the commissures
- Non-compliant patients
- Known social or psychological barriers\(^*\)

**Recommended direct communication between surgeon and OT throughout this entire process."
Case Studies: Case 1
A 3-year-old male status post motor vehicle accident with facial fractures, friction burns, and facial de-gloving, requiring surgical reconstruction and skin grafting.
- Location of Burn: LEFT side of the mouth
- Main Barrier: Age
  - (*Splints were only introduced after the OT was familiar with the child and the family throughout multiple facial surgeries and outpatient clinic visits, including Total Contact mask fit, etc.)
- Thorough caregiver support
- Primarily out-patient
- Results following mouth splinting: Increased mouth ROM, which resulted in SPEECH DEVELOPMENTS

Case Studies: Case 2
A 45-year-old male status post full-thickness scald burns with initial injury and surgical intervention in Saudi Arabia. The subject was seen at our institution for facial reconstruction and release of his oral commissures.
- Location of Burn: CIRCUMFERENTIAL mouth burn
- Main Barrier: Language & small pre-operative ROM
  - (*Translation was obtained & handouts were valuable for the patient’s understanding and protocol follow up.)
- Accelerated protocol; Good family support
- Both in-patient and out-patient
- Results following mouth splinting: Increased mouth ROM, which resulted in IMPROVED ORAL HYGIENE

Case Studies: Case 3
A 9-year-old male status post full-thickness flame burns to his face and requiring skin grafting.
- Location of Burn: RIGHT side of the mouth
- Main Barrier: Social barriers
  - (*Acceptance of altered body image and varied family support.)
- Compliant patient
- Both in-patient and out-patient
- Results following mouth splinting: Increased mouth ROM, which resulted in IMPROVED NUTRITION FOR TRANSITION HOME
Mouth Splints

Overall gains were universally positive.\textsuperscript{2}

The introduction of clinic fabricated thermoplastic mouth splints may be a valuable addition to the burn therapist’s approach to increase available AROM of the mouth and overall quality of life.

EXPERIMENT & DISCOVER!

If “Plan A” doesn’t work, just remember there are 25 other letters in the alphabet.

-Unknown

References


\textsuperscript{2} Gilchrist, J. Potenza, B. Tenenhaus, M. Occupational Therapy Intervention For The Mouth Following Traumatic Facial Burns. Poster and abstract presentation at the American Burn Association 45th annual meeting, Palm Springs, California, April 2013.
CLINICAL PEARLS: Hand Orthotics

ONE CASE, MANY VICES & DEVICES

by Nora Barrett, MS, OTR/L, CHT
Learning Objectives

- Identify postures and patterns of dysfunctional motion in the acute hand burn that may benefit from Casting Motion to Mobilize Stiffness (CMMS)
- Appreciate need for differential tissue assessment in a dorsal hand burn to determine appropriate treatment technique
- Identify orthotic and casting solutions through the continuum of care in a delayed healing dorsal hand burn to maximize fisting and function

Case: 22yo Male Dorsal Hand Grease Burn

- Early posturing
  - Wrist hyperflexion
  - Digital MCP extension
- Ineffectual pattern of motion
  - Prominent edema
  - Muscular inhibition
- Post burn day (PBD)#4
Intra-Operative

- Eschar excision, prior to xenograft placement
- Pattern still prominent

- PBD#5

Deep Dermal Wound

- Non-healing dorsal hand, MCP joints and proximal phalanges
- OR scheduled for autograft**
- Wrist position supported
  - Consequential change of MCP posturing

- PBD#10, POD#5 xenograft

** Refused OR **

- Delayed healing dorsal hand burn
- Preliminary wound closure after serial silvadene dressings
- Posturing apparent

- PBD#39, POD#34
CMMS Cast Fabricated

- Applied PBD#39, POD#34
- Worn continuously for 1-2 weeks
- Cast position:
  - Mid-MCP flexion range to permit isolated flexion
  - Dorsal hood to promote DIP initiated composite flexion
- Glove under cast to protect skin, manage edema

CMMS Cast Removal

- Active functional fist except SF
  - MCP taut into extension
- Blanching over radial digital MCP joints, all PIP joints
- PBD#53

Day of Cast Removal

- Full SF PROM flexion
  - Isolated MCP
  - Composite flexion
- Dorsal blocking orthosis (DBO) fabricated
  - PBD#53 though 3 months
  - Full time wear
  - Limited visits
- Post debridement, scar massage
Anti-Claw Orthosis

- Allows fisting, full wrist motion
- Prevents clawing, maintains dorsal elongation
- Fitted 3 months post burn for daytime use, DBO night
- Full wean to anti-claw orthosis 4 months post-burn
  - Lower profile, less restrictive than DBO

Intrinsic Tightness

- 5 months post burn
- Position of previous cast and orthotics in MCP flexion
  - Promotes intrinsic tightness
- Unable to assume full hook fist position
  - Promotes intrinsic elongation
  - Active hook fist

Path of Intrinsic Muscles

Volar to MCP axis, dorsal to PIP and DIP axis
Contraction: promotes MCP flexion, IP extension
Elongation: allows MCP extension, IP flexion

- Position of intrinsic activation, tightness
- Position of intrinsic elongation
Intrinsic Muscles

- Intrinsic elongation allows IP flexion
- If intrinsics are tight, full active composite fist cannot be achieved

• Active composite fist

Intrinsic Tightness Test

- With the MCP in extension, passively flex the PIP
- With the MCP in flexion, passively flex the PIP

Test is positive for intrinsic tightness if PIP flexion is LESS when MCP extended

Exercise Orthosis

- MCPs held in extension
  - Blocks pull of intrinsics (MCP flexion)
- Patient actively flexes IPs
  - Hook position
- No straps
  - Exercise only

• Hand based mobilization orthosis
Functional Active Fist

- 11 months post burn
- Hypertrophic scar over dorsal hand, MCPs, proximal phalanges
- Continue exercise orthosis, night anti-claw
- Grasp II dynamometer
  - 53# vs R 65#
- Incomplete IF composite flexion

Another Option for Intrinsic Elongation

- MCP blocking cast
  - Removable
  - Used for exercise
  - Blocks MCPs in extension, patient actively flexes IPs into hook fist
  - Plaster rigid, conformable, comfortable
- Finished product: removed after fabrication and exercise

Fabrication MCP Block Cast

- Step One:
  - Cover hand with stockinette long enough to extend distal to PIP joints and just proximal to wrist
  - Do not cut thumb hole
  - Place on hand with thumb in abduction & extension
  - Stockinette on hand
Fabrication MCP Block Cast

• Step Two:
  – 2 layers of cast padding over stockinette
  – Just proximal to PIPs distally
  – Through 1st webspace and angled down to pisiform proximally
  – 2 layers cast padding

Fabrication MCP Block Cast

• Step Three:
  – 2 layers of plaster directly over cast padding
  – Just proximal to PIPs
  – Through 1st webspace and angled toward pisiform
  – Smooth plaster & conform to hand
  – Initial 2 layers of plaster

Fabrication MCP Block Cast

• Step Four:
  – Roll down distal edge of stockinette, roll up proximal edge of stockinette
  – Apply another 2 layers of plaster over initial layers
  – Allow to set then remove
  – Second and final layers of plaster
MCP Blocking Cast

- Start position: IPs extended
- Exercise position: IPs flexed

References

Clark G. The Skinny on Splinting. Rehab Management, 2002; Aug-Sept

Colditz JC. Casting Motion to Mobilize Stiffness: Is It a New Treatment Approach? ASHT Times. 13:3


Correcting Lower Extremity Contractures

Achieving results with chronic open wounds

by Lori Turgeon PT, DPT
Correcting Lower Extremity Contractures

Achieving results with chronic open wounds

Lori Turgeon PT, DPT
Shriners Hospitals for Children™
Boston

Objectives

Upon completion of this presentation the learner will be able to:

- Describe the criteria for use of serial casting in management of complicated joint contractures.
- Identify appropriate treatment applications for modified 'window' serial cast.
- Advocate for alternatives to surgical interventions in the management of joint contractures.

Challenges in Positioning

Positioning is essential in management of burns
  - Splints
  - Casting
  - Positioning devices

Complicated by
  - open wounds
  - exposed tendon
  - exposed bone
  - Patient tolerance of positioning
Challenges in Positioning

In the acute phase, prolonged static stretch can effect the greatest change
• Serial casting
• Serial splinting

How can we balance medical management in the acute phase with goals of improved range of motion and positioning?

Case

PMH: 10 y/o male s/p ~20%TBSA flame injury to (B) LEs
October 2012 when he had a seizure and fell into a campfire in Ghana complicated by h/o TBI
• Treated at burn unit in Ghana Jan 2013 without grafting
• Developed knee flexion contracture, per report was casted at some point for contracture
• Ambulating in Ghana with “walker”

Initial Evaluation

Presented to SHC-Boston 1/31/2013
• Exposed Left patella, tibia, and patellar tendon
• Significant left knee flexion contracture ~90 degrees flexion
• Soft tissue end feel
Treatment Course

First OR 1/31/13
- Debridement of wounds
- Placed in protective knee flexion splint at 90 degrees secondary to exposed bone/tendon
- Radiographs taken to rule in/out joint abnormalities, HO, etc. prior to interventions

Second OR 2/5/13
- Auto grafting left LE
- Cleared to increase PROM through splinting
  - Initial 85-148
  - After prolonged stretch 71-148
- Gravity assisted prolonged stretch = gain 14 degrees

Complications

Immediately post-operatively patient agitated and unsafe
- Noncompliant with NWB Left LE
- Not tolerating splint to Left LE
- Splints held to decrease patient agitation

Within days patient tolerating passive splinting with increased need for anxiety medication and anxiety reduction interventions but compliance was not consistent.

Stent Down

2/12/13
- Patient returned to OR for primary dressing removal

ROM: 50-120 with prolonged stretch
- Splinted x 1 week
- Gain 35 degrees

**Skin Healing**

Good graft take, with exception of exposed bone and tendon
Continued limitation of knee extension

**Chronic Wounds**

2/1513
- Or for placement of VAC dressing x 2 to improve granulation tissue over exposed tendon and bone
Serial casting with soft cast material to provide prolonged sustained stretch
- Adaptation with ‘window’ to allow for access to VAC dressings

**Materials**

3M Soft Cast
Delta Terry-NetTM
Covidien™ Webri™ Cotton UndercastPadding
Casting Procedure

Positioned patient with slight stretch on knee
Donned Terry Net with cut out to allow for VAC tubing

Padding

Webril padding layer wrapped in figure of 8 pattern
• Windowed for VAC tubing, layered padding to posterior knee

First Roll

Began wrapping with Semi-Rigid Casting Tape
• Began at ankle
• Used figure of 8 pattern up to VAC
**First Roll**

- Spiraled behind knee to avoid pressure over VAC
- Figure of 8 pattern around thigh

**Second Roll**

- Created ‘stays’ to support window in the cast
- Unrolled cast material, fan folding to increase strength
Second Roll
Layered along medial and lateral sides of leg
Used remainder of roll to secure ‘stays’ at distal and proximal ends

Securing Stays

Third Roll
Reinforced cast from distal to proximal end using figure of 8 pattern
Special focus on reinforcing window for VACs
Serial Casting

Typical protocol change serial cast every 3-5 days

- Patient tolerated casting well
  - Ambulating with increased supervision

- Returned to OR 2/18/13 secondary to issues with VAC suction
  - Cast removed in OR
Results

Post casting ROM: 9-120 degrees
- Casted 3 days
- Gain of 41 degrees

Patient able to be managed with standard knee extension splint

Avoided complicated surgical release
- Increased recovery time
- Increased risk of damage to neural/vascular/tendon structures

One Week Post Casting

Discharge Home

Patient ambulating independently

Maintaining full knee extension with knee immobilizer
Discussion Questions

Are there other patient groups this could be used for with success?
What are some of the contraindications for serial softcast application?
What is the cost vs benefit of serial soft casting instead of surgical intervention to manage flexion contractures?
What are the potential complications of serial soft casting versus surgical intervention?
Special thanks to...

Bio Concepts
compression garments
for providing the break refreshments

&

Bio Med Sciences
for providing the bound booklets
Bio Med Sciences

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