Lasers in Medicine

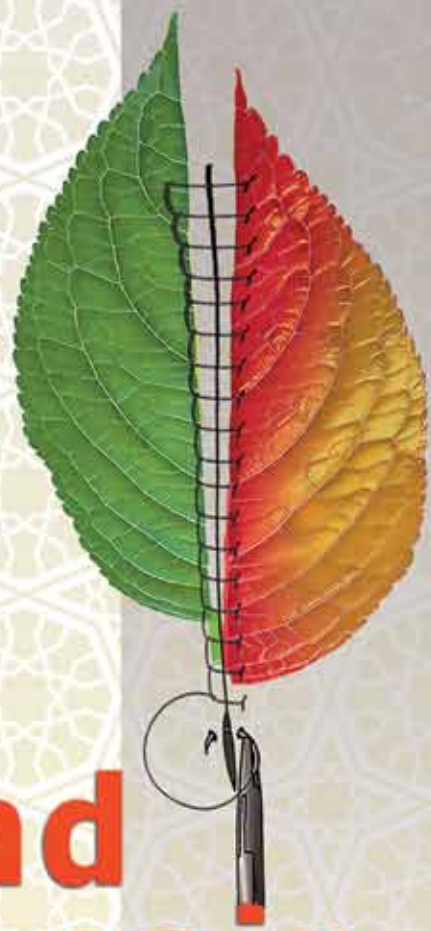
Official Journal of Medical Laser Research Center
Academic Center for Education, Culture and Research (ACECR)

Laser in Medicine is a peer-riviewed open access medical journal. It was established the leading national pulication in the expanding field of the Medical application of Lasers and Lights. It provides a forum of papers on technical, experimental and clinical aspects of the medical Lasers applications. Furthermore, the journal publishes the articles on Lasers, Light delivery systems, sensor to monitor Laser effects, basic Laser-tissue interactions and modeling of Laser-tissue interactions. All other authors are cordially invited to submit their relevant studies on Lasers or any other light tissue interactions to the jounals of the Lasers in Medicine. The journal of Lasers in Medicine provides an online platform for the high quality academic manuscripts, making the JLM an important acamedic journal in the field of Lasers and Light therapies.

No. 66 Abu Reyhan st. Enghlab Ave. Tehran Iran Tel/Fax: +982166494649 website: www.icml.ir

اولین کنگره بین المللی
و سومین کنگره ملی

زخم و ترمیم بافت



Supplement of:

the 1st International and 3rd National Congress of

Wound and Tissue Repair

October 26-28th 2016 Tehran-Iran

www.wtrcongress.com

Clinical Contents

- Dermatology, Internal Medicine and Surgery
- Wound following Environmental Factors, Disasters, War and Job Accident
- Rehabilitation, Nursing, Prevention and Psychosocial Issues
- New Technologies (PRP, Lasers, Negative Pressure, ...)

Basic Sciences Contents:

- Tissue Engineering and Regenerative Medicine in Wound Repair
- Biotechnology in Wound Repair
- Physiopathology, Pharmacology and Microbiology in Wounds
- Biochemistry and Biophysics in Wounds
- Bioinformatics in Wounds

The Congress Organizer

Medical Laser Research Center, ACECR, TUMS Branch

The Organizer Companies

Scientific Secretary Office
Tell: +98 21 66494649
Fax: +98 21 66494649

Executive Secretary Office
Tell: +98 21 44412437
Fax: +98 21 44415233

Lasers in Medicine

October 2016; Special Issue for First International and Third National Wound and Tissue Repair Congress

Contents

Dr. Seyed Mehdi Tabaie

President of 1st International and 3rd National
Congress of Wound and Tissue Repair

In the Name of God

The problem of chronic wounds is a long-standing problem in the medical world as well as in many cases resulted in major disability or early death for the patients. Diabetes, infections and drugs as the leading cause of chronic wounds are still victims in various parts of the globe. The annual cost of treatment of chronic wounds in the world something about a billion dollars is estimated that well illustrates the magnitude of this complication is important. It is important to note that diabetic foot ulcers as a form of chronic wounds 5-year mortality is very high. So that mortality from chronic wounds is higher than most common cancers, such as breast cancer, prostate cancer and Hodgkin›s lymphoma. This is despite the fact that in our country there is not a comprehensive center that effectively made the diagnosis, treatment and rehabilitation of patients need in the field of chronic wounds. Academic center for education, culture and research of Tehran University of Medical Sciences branch understood this necessity and has been active in the field of chronic wounds significant activity in the areas of research, treatment and education for several years. Establishment of the first International Congress of wound and tissue repair in October 2016, is a proclamation for the attention of the scientific community and policymakers in the field of health in the subject of chronic wounds. The conference will be an opportunity to review the latest scientific and practical achievements to be put to the proof. So perhaps in this way to achieve a model-based knowledge in the field covered fulfilled.

Dr. Parvin Mansouri

Scientific Chair
in Clinical Sciences

Dr. Mansour Jamali Zavareh

Scientific Chair
in Basic Sciences

Dr. Siamak Bashardoust Tajali

Scientific Secretary
in Clinical Science

Dr.Gholamreza Esmaili Djavid

Scientific Secretary
in Basic Science

Message of Scientific Chairs
First International and Third National Congress of Wound and Tissue Repair

In the name of God whose name is healing

With the help of Almighty God and the cooperation of respected authorities of Academic Center for Education, Culture and Research (ACECR) – Tehran University of Medical Sciences Branch, preparations for holding the first international and third national congress of wound and tissue repair have been provided. At the third congress of wound and tissue repair with an approach to the latest researches and developments in this field, the material in both clinical and basic sciences will be presented simultaneously in two halls.

More efforts have been concentrated on presenting new diagnostic and therapeutic approaches relevant to the appropriate fields. Since the congress of this year is an international congress, we have invited foreign scholars from abroad to present their research achievements and share the novel ideas based on high quality evidences with all relevant colleagues.

With the hope to great efficiency and high values of information sharing in this congress, we remind that the attendees' desires encourage us to present more effective lectures and continue our way in this important area.

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Congress Scientific Secretary in Basic Sciences

Gholamreza Esmaili Djavid, *Medical Laser Research Center, Academic Center for Education, Culture and Research, Tehran University of Medical Sciences Branch*

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Sadeghi Majid, *Tarbiat Modares University*

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Dr. Mohsen Fateh

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Executive Coordinator Arezo Aghazadeh

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Manager of Hall B Dr. Reza Hosseinzadeh

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Hall A

Wednesday, 26th October 2016

Opening Session	
Holy Quran	8:30 – 8:40
Opening Session	8:40 – 10:00
Break	**10:00 – 10:30**

Clinical Sciences – Dermatology in Wound Healing and Tissue Repair		
Scientific Committee	*Dr. Seyed Mehdi Tabaie, Dr. Parvin Mansouri, Dr. Abdol-Mohammad Kajbafzadeh, Dr. Gholamhossein Ghaffarpour*	
Stem cells and chronic wound healing	**Dr. Seyed Mehdi Tabaie** *Chair, Academic Center for Education, Culture & Research Tehran Uni. Medical Sc. Branch*	10:30 – 10:45
Botulinum Toxin type A (BTA): Implications in wound healing and scars	**Dr. Parvin Mansouri** *Skin/Stem Cell Res. Center Tehran Uni. Medical Sc.*	10:45 – 11:00
Applications of acellular dermal matrix allograft for lower genitourinary tract reconstruction following sophisticated quality control	**Dr. Abdol-Mohammad Kajbafzadeh** *Dept. of Pediatric Urology Tehran Uni. Medical Sc.*	11:00 – 11:15
Treatment of cutaneous leishmaniasis skin lesion: A brief overview and future plan	**Dr. Ali Khamesipour** *Center for Res. & Training in Skin Diseases and Leprosy, Tehran Uni. Medical Sc.*	11:15 – 11:30
Treatment of cutaneous leishmaniasis skin lesion: A brief overview and future plan	**Dr. Ali Khamesipour** *Center for Res. & Training in Skin Diseases and Leprosy, Tehran Uni. Medical Sc.*	11:15 – 11:30
A new surgical technique for correcting onychogryphosis	**Dr. Gholamhossein Ghaffarpour** *Dept. of Dermatology Iran Uni. of Medical Sciences*	11:30 – 11:45
Lymphedema and wound healing	**Dr. Shahpar Haghighat** *Breast Casncer Res. Center Academid Cenyer for Education, Culture & Research*	11:45 – 12:00
Compare the clinical efficacy and acceptability of Acticoat™, chitosan-based biocompatible dressing (IPPISKIN dressing) and Amnion dressing for refractory diabetic foot wounds	**Dr. Somayeh Hejazinia** *Skin/Stem Cell Res. Center Tehran Uni. Medical Sciences*	12:00 – 12:15
Pray and Lunch		12:15 – 13:15
Poster Presentation		13:15 – 14:00

Clinical Sciences – Wounds following Environmental Factors / New Technologies in Wound Healing and Tissue Repair		
Scientific Committee	*Dr. Nasrin Zand, Dr. Behrouz Attarbashi Moghadam, Dr. Mehdi Shiri, Dr. Abbas Majdabadi*	
Immunoadsorption in autoimmune blistering diseases	**Dr. Mehdi Shiri** *Dept. of Dermatology* *Tehran Uni. Medical Sciences* *Kassir Dermatology* *Dallas Texas - USA*	14:00 – 14:15
Acute and long-term skin damage due to chemical weapon	**Dr. Seyyed Masoud Davoudi** *Dept. of Dermatology* *Baqiyatallah Uni. Medical Sc.*	14:15 – 14:30
Laser diode in wound healing (why & how)?	**Dr. Abbas Majdabadi** *Laser & Optics Research School*	14:30 – 14:45
Investigation of the effective parameters on the wound healing process in low level laser	**Dr. Hossein Khosravi** Dept of Medical Physics Salamat Institute Chamran Hospital - Tehran	14:45 – 15:00
Laser photobiomodulation in prevention and treatment of radiodermatitis; indications and pitfalls	**Dr. Nasrin Zand** *Med. Laser Res. Center* *Academic Center for Education, Culture and Research*	15:00 – 15:15
How laser and LED may affect wound healing?	**Fariba Mansouri** *Dept. of Gas Lasers* *Laser and Optics School* *Pasture Institute of Iran*	15:15 – 15:30
Role of hyperbaric oxygen therapy (HBOT) in chronic wound management	**Dr. Ahmad Ebadi** *Research Center Defense Med Chamran Hospital - Tehran*	15:30 – 15:45
Electrical stimulation in wounds at risk of compromised healing	**Dr. Siamak Bashardoust** *Med. Laser Res. Center - ACECR* *Tehran Uni. Medical Sciences*	15:45 – 16:00

Hall A

Thursday, 27th October 2016

Clinical Sciences – Internal Medicine & Surgery in Wound Healing and Tissue Repair – Session I		
Scientific Committee	*Dr. Ahmad Kaviani, Dr. Mohammad Reza Ghasemi, Dr. Mohammad Reza Shafii, Dr. Amir Reza Farhoud*	
Participating in regenerative medicine clinical trials: a right or a privilege?	**Dr. Hamidreza Bidkhori** *Academic Center for Education, Culture & Research, Khorasan Razavi Branch*	8:30 – 8:45
Management of deep sternal wound infection by negative pressure wound therapy with or without water jet rather than conventional therapy	**Dr. Hamidreza Davari** *Dept. of Surgery* *Tehran Uni. of Medical Sciences*	8:45 – 9:00
Management of skin ulcers caused by breast cancer	**Dr. Ahmad Kaviani** *Dept. of Surgery* *Tehran Uni. of Medical Sciences*	9:00 – 9:15
Iatrogenic Ulcers	**Dr. Mohamad Reza Ghasemi** *Dept. of Dermatology* *Iran Uni. of Medical Sciences*	9:15 – 9:30
Novel ideas in minimal invasive approach to maxillofacial trauma for large wound prophylaxis	**Dr. Mohammad Reza Shafii** *Dept. of Plastic & Reconstructive Surgery, Kermanshah Uni of Medical Sc.*	9:30 – 9:45
Clinical application of maggot therapy to treat diabetic foot ulcer and infection What are contraindications?	**Dr. Amir Reza Farhoud** *Dept. of Orthopedics* *Tehran Uni. of Medical Sciences*	9:45 – 10:00
Break		10:00 – 10:30

Clinical Sciences – Internal Medicine & Surgery in Wound Healing and Tissue Repair – Session II		
Scientific Committee	*Dr. Mohammad Javad Fatemi, Dr. Farhad Hafezi, Dr. Ali Mehdizadeh, Dr. Abtin Jian*	
New approaches in keloids and hypertrophic scar management	**Dr. Mohamad Javad Fatemi** *Dept. of Plastic & Reconstructive Surgery - Motahari Hospital* *Iran Uni. of Medical Sciences*	10:30 – 10:45
Scar prevention and treatment	**Dr. Farhad Hafezi** *Dept. of Plastic & Reconstructive Surgery - Motahari Hospital* *Iran Uni. of Medical Sciences*	10:45 – 11:00
Wound management in Iran	**Dr. Mahnoosh Momeni** *Dept. of Plastic & Reconstructive Surgery - Motahari Hospital* *Iran Uni. of Medical Sciences*	11:00 – 11:15
Pressure, neuropathic and diabetic ulcers	**Dr. Azadeh Goodarzi** *Dept. of Dermatology* *Iran Uni. of Medical Sciences*	11:15 – 11:30
Atypical wounds: Hidradenitis Suppurativa	**Dr. Ali Mehdizadeh** *University of Toronto - CANADA*	11:30 – 11:45
Brachioplasty, the most challenging scar in plastic surgeries	**Dr. Abtin Jian** *Aesthetic Medical Practitioner*	11:45 – 12:00
New insight about role of insulin in wound healing process: Mechanism of action and pharmaceutical applications	**Dr. Leila Novin** *Multidisciplinary Wound Clinic* *Academic Center for Education Culture and Research*	12:00 – 12:15
Pray and Lunch		12:15 – 13:15
Poster Presentation		13:15 – 14:00

Clinical Sciences – Prevention, Rehabilitation, Nursing, Nutrition, Psychosocial Issues in Wound Healing and Tissue Repair		
Scientific Committee	*Dr. Siamak Bashardoust Tajali, Dr. Mahnoosh Momeni, Dr. Kurosh Djafarian*	
Assessment of nurses role in bedsore prevention in Intensive Care Unit	**Kobra Esfandani** *Dept. of Nursing* *AJA Uni. of Medical Sciences*	14:00 – 14:15
The role of nutrition in wound healing	**Dr. Kurosh Djafarian** *Dept. of Nutrition* *Tehran Uni. of Medical Sciences*	14:15 – 14:30
Role of off-loading and total contact casting in management of neuropathic diabetic foot ulcers	**Maeve Kelly** *Derma Sciences, Managing Director* *E.M.E.A – United Kingdom*	14:30 – 14:45
Common myths in wound treatment	**Reza Afshar Shandiz** *Coloplast Wound Care - Denmark*	14:45 – 15:00
Bioimplant dressing in comparison with wet dressing for the treatment of diabetic foot ulcers	**Dr. Alireza Firooz** *Center for Research & Training in Skin Disease and Leprosy* *Tehran Uni. of Medical Sciences*	15:00 – 15:15
Chronic inflammation and depression	**Dr. Mohammad Arbabi** *School of Medicine* *Tehran Uni. Medical Sciences*	15:15 – 15:30
Evaluation of episiotomy wound infection in Motahari hospital of Urmia in 1394	**Mahnaz MohammadPouri** *Motahari Hospital (Urmia)* *Urmia Uni. of Medical Sciences*	15:30 – 15:45
New approaches in prevention and management of pressure ulcer in cardiac patients	**Dr. Bahram Ghaderi** *Sh. Madani Heart Hospital (Tabriz)* *Hacettepe Uni. Ankara - Turkey*	15:45 – 16:00

Hall A

Friday, 28th October 2016

Clinical Sciences – Wounds following Environmental Factors, Disasters, War and Job Accident / Iranian Traditional Medicine in Wound Healing and Tissue Repair		
Scientific Committee	*Dr. Mohsen Fateh, Dr. Mohammad Ali Bahar, Dr. Masoumeh Rohaninasab*	
Treatment of pressure ulcers in Iranian traditional medicine, A comparative study with modern medicine	Dr. Yasaman Vahedi Mazdabadi *Persian Med. Research Center* *Tehran Uni. of Medical Sciences*	8:30 – 8:45
Bed sore; prevention and treatment in Iranian traditional medicine	Dr. Aniseh Saffar Shahroodi *Dept. Traditional Persian Med.* *Shiraz Uni. of Medical Science*	8:45 – 9:00
How curcumin may affect proliferation, migration and collagen secretion of skin-derived fibroblast cells	Dr. Mohammad Ali Bahar *Burn Research Center* *Iran University of Medical Sciences*	9:00 – 9:15
Is there any flood-related skin disorders?	Dr. Masoumeh Rohaninasab *Iran University of Medical Sciences*	9:15 – 9:30
Effect of Iranian effective medicine on treatment of 20 diabetic foot ulcer in patients with grade 2 and 3: A comparative study with low level laser therapy and ANGIPARS	Dr. Hassan Haj Talebi *Dept. of Health, Hajtaleb Medical Complex Bojnurd*	9:30 – 9:45
Effects of medicinal plants and traditional medicine in wound healing	Azadeh Negaresh *Faculty of Medicine* *Islamic Azad University*	9:45 – 10:00
Break		10:00 – 10:30

Clinical Sciences – Internal Medicine & Surgery in Wound Healing and Tissue Repair – Session III New Methods in Wound Management, Healing and Tissue Repair		
Scientific Committee	*Dr. Seyed Mehdi Tabaie, Dr. Parvin Mansouri, Dr. Aziz Ghahari, Dr. Sina Nasiri*	
A new strategy in preventing post burn hypertrophic scarring	**Dr. Aziz Ghahari** *Dept. of Surgery, Faculty of Medicine,* *Uni. of British Columbia, Canada*	10:30 – 11:00
Role of advanced bioactive wound dressings in treating diabetic foot ulcers	**Dr. Sohelia Selahshour Kordestani** *Dept. of Medical Engineering* *Amirkabir University of Technology*	11:00 – 11:15
Functional analysis of transcriptional response during cutaneous wound healing in db/db mice	**Dr. Sina Nassiri** *School Biomedical Engineering* *Drexel University* *Philadelphia - USA*	11:15 – 11:30
Values of medical leech application in treatment of ischemic finger	**Ghasem Raeis Akbary** *Dept. of Nursing* *Shahid Beheshti Uni. Medical Sciences*	11:30 – 11:45

Closing Session	
Holy Quran	11:45 – 11:50
Closing Ceremony	11:50 – 12:30

Hall B

Wednesday, 26th October 2016

Basic Sciences - Biophysics/Biochemistry/Bioinformatics in Wound Healing and Tissue Repair		
Scientific Committee	*Dr. Mansour Jamali Zavareh, Dr. Bahram Goliaei, Dr. Gholamhossein Riazi, Dr. Khatereh Khorsandi*	
Relationship between emotional injury and Body injury	Dr. Gholamhossein Riazi *Dept. of Biochemistry* *University of Tehran*	10:30 – 10:45
An overview of low vacuum applications in the field of biology with an emphasis on wound healing	Dr. Jalil Badraghi *Research Institute of Applied Sciences, ACECR* *Shahid Beheshti University*	10:45 – 11:00
Extremely low frequency magnetic field therapy as a novel therapeutic method for tissue regeneration and wound healing	Dr. Alireza Majid Ansari *Dept. of Biotechnology* *Pasteur Institute of Iran*	11:00 – 11:15
Stability study of chondroitinase ABC I for improving the repairing of spinal cord injuries	Mina Naderi *Medical Laser Research Center, ACECR, TUMS Branch*	11:15 – 11:30
Biological study (in vitro & in vivo) of helium cold atmospheric plasma for wound healing	Seyed Amir Mirmotalebi Sohi *Dept. of Biology* *Islamic Azad University*	11:30 – 11:45
Nano photodynamic therapy in wound healing	Dr. Khatereh Khorsandi *Photodynamic Research Group, ACECR, TUMS Branch*	11:45 – 12:00
Noninvasive optical technologies for wound imaging	Afshan Shirkavand *Medical Laser Research, ACECR, TUMS Branch*	12:00 – 12:15
Pray and Lunch		12:15 – 13:15
Poster Presentation		13:15 – 14:00

Basic Sciences - Physiopathology/Histopathology/Genetics in Wound Healing and Tissue Repair		
Scientific Committee	*Dr. Majid Pornour, Dr. Majid Sadeghizadeh, Dr. Nasrin Takzareh, Dr. Sattar Ostadhadi*	
Polymerized nano-curcumin attenuates neurological symptoms in EAE model of multiple sclerosis through down regulation of inflammatory and oxidative process and enhancing neuroprotection and myelin repair	**Dr. Majid Sadeghizadeh** *Dept. of Molecular Genetics* *Tarbiat Modares University*	14:00 – 14:15
Promotion of wound-healing effects by alcoholic extract Stevia's bitter fraction in experimental rats	**Fariba Najafi** *Dept. of Dermatology* *Kermanshah Uni. Medical Sc.*	14:15 – 14:30
Probable effects of Dopamine receptors in pathogenesis of diabetic wounds	**Dr. Majid Pornour** *Medical Laser Research Center* *Academic Center for Education, Culture & Research*	14:30 – 14:45
Acceleration of skin wound healing: Evaluation of expression Transforming Growth Factor-ß (TGF- β) exposed to inducing compounds	**Dr. Nasrin Takzaree** *Dept. of Anatomy* *Tehran Uni. Medical Sciences*	14:45 – 15:00
Possible involvement of nitric oxide pathway in anti-scratching activity of metformin on chloroquine-induced scratching in mice	**Dr. Sattar Ostadhadi** *Brain & Spinal Cord Injury Research Center, Neurosciences Institute, Tehran Uni. Medical Sc.*	15:00 – 15:15
Evaluation of in vivo wound healing activity of Fumaria Vaillantii total extract on different wound models in rats	**Fatemeh Davoodi Roodbordeii** *Dept. of Pharmaceutics* *Islamic Azad Uni. Tehran*	15:15 – 15:30
Biophysical approaches for wound healing	**Hoda Keshmiri** *Medical Laser Research Center* *Academic Center for Education, Culture & Research*	15:30 – 15:45
Autologous component in chronic wound healing from hospital/office to home	**Dr Sadegh Hasannia** *Dept. of Biochemistry* *Tarbiat Modares University*	15:45 – 16:00

Hall B

Thursday, 27th October 2016

Basic Sciences - Biophysics/Biochemistry in Wound Healing and Tissue Repair/Animal Studies		
Scientific Committee	*Dr. Leila Ataie Fashtami, Dr. Saeed Shafieyan, Dr. Jafar Ai*	
Does low level laser have any effect on healing of temporomandibular joint osteoarthritis in rats?	Ramin Rahati *Faculty of Dentistry* *Rafsanjan Uni. Medical Science*	8:30 – 8:45
Does Heavy use of mobile phone decelerate wound healing?	Najmeh Jooyan *Inst. Biochemistry & Biophysics* *University of Tehran*	8:45 – 9:00
Decellularized scaffolds for skin tissue engineering	Dr. Jafar Ai *Faculty Advanced Tech. in Med.* *Tehran Uni. Medical Sciences*	9:00 – 9:15
Ethnomedicinal plants: wound healing potential of Punica granatum's aqueous cream extract in experimental rats	Nasim Amiri *Dept. of Dermatology* *Kermanshah Uni. Medical Sc.*	9:15 – 9:30
Organoids	Dr. Saeed Shafieyan *Regenerative Med. Dept.* *Royan Institute*	9:30 – 9:45
Physical and antimicrobial properties of starch-based film containing ethanolic propolis extract for biomedical applications	Asghar Eskandarinia *Dept. of Tissue Engineering* *Isfahan Uni. Medical Sciences*	9:45 – 10:00
Break		10:00 – 10:30

Basic Sciences - Regenerative Medicine/Stem Cell/Cell Therapy in Wound Healing andTissue Repair		
Scientific Committee	*Dr. Hamid Reza Bidkhori, Dr. Maryam Moghadam Matin, Dr. Hojjat Naderi Meshkin, Dr. Marzieh Lotfi*	
An ideal skin substitute for wounds regeneration	**Dr. Hojjat Naderi Meshkin** *Stem Cell & Reg. Med Res. Group Academic Center for Education Culture & Research, Khorasan Razavi Branch*	10:30 – 10:45
Keratinocyte-like Cells (KLCs): New drug for old wounds	**Muhammad Irfan-Maqsood** *Dept. Regenerative Medicine, Jinnah Institute Gene & Cell Therapy - Pakistan*	10:45 – 11:00
Evaluation of antimicrobial efficacy of colloidal silver and effect of colloidal silver in wound re-epithelialization	**Shiva Dehghan** *Isfahan Uni. of Medical Sciences*	11:00 – 11:15
Comparative effects of Silver Sulfadiazine and Stimulated Mesenchymal stem cell with LPS and Poly-I-c on burn healing	**Leila Soleymani** *Dept. of Biology Urmia University*	11:15 – 11:30
Hair follicule stem cell application in cutaneous wound healing	**Fatemeh Heidari** *Dept. of Anatomy Qom Uni. of Medical Sciences*	11:30 – 11:45
A new approach for optimization of Keratinocyte culture and fabrication of Keratinocyte epidermal sheets without using 3T3 feeder layer	**Maliheh Hassanzadeh** *Stem Cell & Reg. Med. Res. Group Academic Center for Education, Culture & Research, Khorasan Razavi Branch*	11:45 – 12:00
Electrospun nanofiberous scaffolds based on gelatin and chitosan–ß-glycerol phosphate with suitable mechanical and biological properties for tissue engineering and Wound healing	**Dr. Marzieh Lotfi** *Mashhad Uni. Medical Sciences*	12:00 – 12:15
Pray and Lunch		12:15 – 13:15
Poster Presentation		13:15 – 14:00

Basic Sciences – Microbiology, Biofilms and Biomaterial in Wound Healing and Tissue Repair		
Scientific Committee	*Dr. Ali Akbar Salehian, Dr. Kamran Akbarzadeh, Dr. Esmaiel Darabpour*	
Successful examples of Maggot debridement on patients with diabetic foot ulcer & kidney disorders	**Azam Malekian** *Faculty of health Sciencdes Tehran Uni. Medical Sciences*	14:00 – 14:15
Biofilms in wounds and antibiofilm strategies	**Dr. Ahya Abdi Ali** *Dept. of Microbiology Alzahra University*	14:15 – 14:30
Evaluate the antimicrobial effect of Lactobacillus Gasseri on Pseudomonas Aeruginosa isolated from clinical samples of burn patients	**Mahsa Zolfaghari** *Microbiologist Dept. of Pharmacology Sc.*	14:30 – 14:45
Improving the efficacy of photodynamic therapy for bacterial biofilms using different nanosystems	**Dr. Esmaiel Darabpour** *Dept. of Microbiology University of Tehran*	14:45 – 15:00
Hydrogel wound dressing with effective drug release to the wound site	**Mahmood Ghafghazi** *Dept. of Polymer Engineering Amirkabir Uni. of Technology Administrator of tebazist polymer co.*	15:00 – 15:15
Effects of topical application of Lactobacillus Acidophilus on the second degree burn wounds in male rats	**Masoud Hashemzaei** *Dept. of Biothechnology University of Maraghe*	15:15 – 15:30
Effects of Lactobacillus Rhamnosus on healing process of second degree burn wound in wistar rats	**Dr. Amir Abbas *Barzegari Sorkheh*** *Dept. of Physiology University of Maragheh*	15:30 – 15:45
Effects of treatment by Lactobacillus Delbrueckii and Lactobacillus Acidophilus isolated from probiotic dairy products on repair of skin wounds caused by thermal burn in mature male wistar rat	**Hadi Zamani** *Salamat Institute Chamran Hospital - Tehran*	15:45 – 16:00

Hall B

Friday, 28th October 2016

Clinical Sciences – Measurement Methods/New Technologies in Wound Healing and Tissue Repair		
Scientific Committee	*Dr. Noosh Afarin Kazemikhoo, Dr. Mohammad Nazari, Dr. Mohammad Kazazi*	
Effects of ozone therapy on wound healing acceleration in diabetic foot ulcers	Mansoureh Farhadian *Tehran Uni. Medical Sciences*	8:30 – 8:45
Hyperbaric oxygen as a novel treatment for Osteo Radio Necrosis	Dr. Saeid Farzaneh *Bahar HBOT Center - Isfahan* *Wound Care Medicine Center* *St. Antonio Texas - USA*	8:45 – 9:00
Analysis effects of autologous fibroblast transplantation and low-level laser therapy in the healing process of grade 3 burn wounds in diabetic patients	Dr. Noosh Afarin Kazemikhoo *Dept. of Dermatology* *Tehran Uni. Medical Sciences*	9:00 – 9:15
Minimally invasive treatment of herniated disc	Dr. Mohammad Nazari *Medical Laser Research Center* *Academic Center for Education, Culture & Research*	9:15 – 9:30
Clinical study of intravenous low level laser therapy in diabetic foot ulcers grades 2 and 3	Dr. Hamed Saleh Barmi *Dept. of Pharmacology* *Tehran Uni. Medical Sciences*	9:30 – 9:45
Effects of He-Ne low level laser therapy on wound healing after amputation	Dr. Mohammad Kazazi *Cardiovascular Surgeon* *Milad Hospital - Tehran*	9:45 – 10:00
Break		10:00 – 10:30

Basic Sciences - Cell & Tissue Engineering/Biomaterials in Wound Healing and Tissue Repair		
Scientific Committee	*Dr. Seyed Mostafa Fatemi, Dr. Reza Hosseinzadeh* *Dr. Sima Shahabi*	
Bone substitute material surface	**Dr. Seyed Mostafa Fatemi** *Medical Laser Research Center* *Academic Center for Education, Culture & Research*	10:30 – 10:45
Socket bone preservation	**Dr. Ali Davodi** *Shahid Beheshti Uni. Medical Sc.*	10:45 – 11:00
Electrospinning nanofibers production and its medical applications in wound healing, drug delivery and tissue regeneration	**Dr. Reza Hosseinzadeh** *Med Laser Research Center* *Academic Center for Education, Culture & Research*	11:00 – 11:15
Novel approaches in skin tissue engineering	**Parinaz Abdollahiyan** *Dept. of Nanomaterials University of Maragheh*	11:15 – 11:30
Closing Session → Hall A		11:45 – 12:30

Oral Presentations in Clinical Sciences

Stem Cells and Chronic Wound Healing

Seyed Mehdi Tabaie [1]

1. Dermatologist, Laser in Medical Research Center, ACECR, Tehran, Iran

Corresponding Author: Seyed Mehdi Tabaie, E-mail: mtaba@jdtums.ir

ABSTRACT

Currently available treatments for chronic wounds are inadequate. A clearly effective therapy does not exist, and treatment is often supportive. This is largely because the cellular and molecular processes underlying failure of wound repair are still poorly understood. With an increase in comorbidities, such as diabetes and vascular disease, as well as an aging population, the incidence of these intractable wounds is expected to rise. As such, chronic wounds, which are already costly, are rapidly growing as a tremendous burden to the health-care system. Stem cells have garnered much interest as a therapy for chronic wounds due to their inherent ability to differentiate into multiple lineages and promote regeneration. Herein, we discuss the types of stem cells used for chronic wound therapy, as well as the proposed means by which they do so. In particular, we highlight mesenchymal stem cells (including adipose-derived stem cells), endothelial progenitor cells, and induced pluripotent stem cells. We include the results of recent in vitro and in vivo studies in both animal models and human clinical trials. Finally, we discuss the current studies to improve stem cell therapies and the limitations of stem cell-based therapeutics. Stem cells promise improved therapies for healing chronic wounds, but further studies that are well-designed with standardized protocols are necessary for fruition.

Botulinum Toxin Type A (BTA): Implications in Wound Healing and Scars

Parvin Mansouri [1], Katalin Martits-Chalangari [2], Reza Chalangari [2]

1. Skin & Stem Cell Research Center, Tehran University of Medical Sciences, Tehran, Iran
2. Kassir Dermatology, Dallas, Texas, USA

Corresponding Author: Parvin Mansouri, E-mail: mansorip@sina.tums.ac.ir

ABSTRACT

Botulinum Toxin (BT) is the exotoxin of clostridium botulinum; Botulinum Toxin Type A (BTA) has become one of the most frequently requested products in cosmetic rejuvenation. Botulinum Toxin is commonly used in neurology, orthopedic and plastic surgery to alleviate muscle contractions and spasms. It exerts its effects by reversibly blocking the release of acetylcholine from the presynaptic terminal at neuromuscular junction.

In all skin injuries, contraction occurs in the healing period that may leads to unpleasant view and scars. The management of hypertrophic scars and keloids remains a matter of debate due to lack of effective treatment methods and the inability to prevent recurrences. Recently injection of BTA has been implemented in attempts to prevent keloid formation after surgery, and more recently to treat scars after trauma or surgery.

The theory of reducing wound tension peri-operatively to prophylactically improve the cosmetic appearance of scar makes sense; However, the clinical efficacy and mechanisms by which BTA acts on established keloids still merits further exploration.

Although the preliminary findings are promising, but further in-depth, controlled studies are needed to characterize the effects of BTA on wound healing and scars.

Applications of Acellular Dermal Matrix Allograft for Lower Genitourinary Tract Reconstruction Following Sophisticated Quality Control

Abdol-Mohammad Kajbafzadeh [1]

1. Pediatric Urology and Regenerative Medicine Research Center, Department of Pediatric Urology, Children's Hospital Medical Center, Pediatric Center Excellence, Tehran University of Medical Sciences, Tehran, Iran (IRI)

Corresponding Author: Abdol-Mohammad Kajbafzadeh, E-mail: kajbaf105@gmail.com

ABSTRACT

Background: Tissue engineering and regenerative medicine has been considered as an interdisciplinary field, which opened new era for treating patients with genitourinary disorders. The field of urologic tissue engineering has been approached to maintain normal urinary/sexual function and preserve fertility. The aim of this speech is to present the results of tissue and organ deceluularization techniques and focus on the applications of acellular dermal matrix allograft (ADMA) for lower genitourinary tract reconstruction following sophisticated quality control during the last two decades at our center.

Methods and Results: Different protocols for skin acellularization were developed from several animals (from Nude mice to sheep) as well as acellular human dermal matrix (AHDM) in order to pave the road for experimental, preclinical and clinical applications of ADM. These natural scaffolds represent a logical therapeutic option for the treatment of several urological conditions. These biological scaffolds actually allow the tissue to grow into it, and then become permanently integrated into the body without seeding relevant cells. The application of ADMA for the reconstruction of hollow organs of the urogenital tract (bladder/urethra and vaginal substitution or repair) has shown promising results. Recently, highly representative progresses have been introduced to develop our understanding of skin tissue engineering and to increase the medical safety, biocompatibility, durability and elasticity of ADM for further clinical application. Recreate an efficient urothelial lining in the urinary tract has been considered as a challenging concern in reconstructive plastic surgery within the urogenital tracts. ADM has the ability to be used as substitute material for treatment of several urological conditions such as congenital loss of part of the urethra, abdominal hernia repair, hypospadias, vaginal sling repair, and vaginal agenesis. The feasibility, efficacy and safety of decellularized dermal strip as a sling material has been also reported in the pudendal denervated

stress urinary incontinence in an animal model at our center. The application of ADMA for allowing the natural ability of the body to generate new tissue was evaluated in several experimental and few clinical studies at our institution. We are also conducting clinical studies in hypospadias as well as sex reassignment surgery and suburethral sling material using these natural scaffolds. We are also evaluating the safety and efficacy of using ADM for transvaginal slings to treat stress urinary incontinence in animal model.

Conclusion: There is cautious optimism that the tissue engineered skin tissue can play a crucial role in the management of refractory genitourinary diseases. Although we obtained satisfactory outcomes by using ADMA in urological area, we thought that highly sophisticated quality control of these skin scaffolds following sterilization and multicenter experimental/clinical studies could provide an early opportunity to assess the success of the repair, and evaluate the potential complications when using ADMA for surgical procedures of urological conditions. In conclusion, safety and effectiveness of engineered skin tissue scaffolds are the most critical issues which must be addressed prior to and during multicenter clinical trials.

In reconstructive surgery of lower urinary tract such as hypospadias cripple and complex urethra stricture, the ADMA may serve as an ideal replacement material from human acellular skin matrix as a safe, effective, minimally invasive and economic method in urologic plastic surgery.

Treatment of Cutaneous Leishmaniasis Skin Lesion: A Brief Overview & Future Plan

Ali Khamesipour [1]

1. Center for Research and Training in Skin Diseases and Leprosy, TUMS, Tehran, Iran

Corresponding Author: Ali Khamesipour, E-mail: khamesipour_ali@yahoo.com

ABSTRACT

Human infection with Leishmania parasites which presents several different clinical forms of diseases; Cutaneous Leishmaniasis (CL), the most common form of the disease and Visceral Leishmaniasis (VL) which is the fetal form of the disease. Due to the diversity of epidemiological characteristics, specific to each species and its environment, vector and reservoir controls are impractical, costly and usually requires political commitment and infrastructures beyond the means of the countries suffering most from this disease and as such the disease is expanding to new foci and the incidence rate is increasing in some of the endemic areas. CL is usually a self-healing lesion but leaves a disfiguring scar, which leads to stigma, isolation and barrier to marriage, especially for girls. In case of severe forms of CL such as recidivans and non-healing forms, no efficacious treatment is available. Pentavalent antimonials (Sb+5) have been introduced since 1930s and still is the first-line WHO recommended treatment for all types of CL. Antimonials require multiple injections which are uncomfortable and painful, so full recommended course is not tolerated by most of the patients and resulted in low compliance. The efficacy of antimonials depends upon the Leishmania species and usually is low and resistant is reported. Moreover, Antimonials are contraindicated in pregnancy, heart/ renal failure, hepatic disease and diabetes and accompanies serious side effects, which in the worst scenario, it might cause death if not carefully monitored. CL patients do not need hospitalization, so the cost of treatment is not high, but still is not affordable for most of the endemic areas. Development of safe and efficacious drugs is urgently needed. There is no global interest in drug development against CL, so endemic countries, NGOs and international agencies need to invest. Clinical trials to assess the efficacy of various modalities on leishmaniasis have been carried out in different parts of the world, but mostly suffer from inadequacies related to different issues such as design, sample size, endpoints etc. Currently, in addition to antimonials, several lines of drugs like Ambisome (liposomal form of Amphotericin B), Miltefosine and Paromomycine are available for the treatment of VL but not for CL. So far, therapeutic strategies for CL traditionally have been designed based on using anti-parasitic agents with unacceptable efficacy rate. In this presentation, available treatment strategies will be discussed. It seems that anti-parasitic agents are not fully effective and future plans for drug design for the treatment of CL in addition to anti-parasitic agents needs to include immunomodulators as well as agents, which facilitate ulcer healing.

A New Surgical Technique for Correcting Onychogryphosis

Gholamhossein Ghaffarpour [1], Mohammadreza Ghassemi [2], Zahra Azizian [3], Shiva Ghods [3]

1. Dermatologist, Associate Professor of Iran University of Medical Sciences, Tehran, Iran

2. Dermatologist, Assistant Professor of Iran University of Medical Sciences, Tehran, Iran

2. Resident of Dermatology, Iran University of Medical Sciences, Tehran, Iran

Corresponding Author: Gholamhossein Ghaffarpour, E-mail: ghaffarpourgh@yahoo.com

ABSTRACT

Onychogryphosis is an extreme form of irregular, distorted, thickened and discolored, yellow to brown nails on a hyperkeratotic, hyperplastic and onycholytic nail bed usually in the great toe nails. It may rarely occur as a developmental abnormality in young and middle aged and is transmitted as an autosomal dominant trait.Traditional treatment of onychogryphosis is either radical or palliative.

Conservative management is especially useful in feet, at high risk patients with peripheral vascular disease and diabetes. Radical treatment consists of surgical remove of the nail and matricectomy by phenolization, Co2 laser and so on.

We decided to repair the onychogryphotic toe nail to nearly normal shape by a unique treatment by combination of partial nail matrix phenolization, nail bed widening by longitudinal cuts in the nail bed,onycholysis treatment and displacing the nail matrix and nail bed to opposite direction of nail deviation.

Lymphedema and Wound Healing

Shahpar Haghighat [1]

1. Lymphotherapist, Breast Casncer Research Center, ACECR, Tehran, Iran

Corresponding Author: Shahpar Haghighat, E-mail: sha_haghighat@yahoo.com

ABSTRACT

Lymphemea is an accumulation of protein rich fluid in interstitial tissue. It is one the most common problem which may sometimes present primary or hereditary due to insufficiency or lack of lymph nodes or lymph vessels. The most common form of lymphedema occurs secondary to surgery or injuries to lymph pathways.

Swollen tissue are prone to cutaneous lesions due to impaired blood circulation or stasis of harmful substances. The incidence of different lesions such as lymph cysts, bacterial or fungal infections, dermatitis and papilloma are common in chronic lymphedema. In these cases, the first and best step is preventive cares. Proper Antibiotics, antifungals or anti-inflammatory drugs should be prescribed as soon as possible to control the lesions. Most of these lesions can disturb the superficial lymph vessels drainage and exacerbate the lymphedema. In most situations, combination of local treatment of cutaneous lesions and complete Decongestive Therapy (CDT) have fantastic results. In the case of extensive and serious infective lesions, it is better to postpone the lymphedema treatment and bandaging up to complete remission of infection.

One of the most important clinical observations is inducing edema secondary to vascular lesions, metabolic diseases or local trauma. In these situations, ulcer obstructs lymph flow and aggravate edema. Edema causes insufficient blood supply and healing delay. In this instances, it is suggested to decongest the organ by CDT accompanied by local treatment of ulcer. In CDT, manual lymph drainage at the border of ulcer, low stretch multilayer bandaging and rehabilitation exercises are applied by an expert lymphotherapist. It seems that team working of dermatologists and lymphotherapists can provide the most effective treatment results in these patients.

Compare the Clinical Efficacy and Acceptability of Acticoat™, Chitosan-Based Biocompatible Dressing (IPPISKIN Dressing) and Amnion Dressing for Refractory Diabetic Foot Wounds

Hamideh Moravej Farshi, Zoreh Tehranchi, Mohammad Shahidi Dadras, Heidar Masjedi, Azin Ayatollahi, Somayeh Hejazi

Corresponding Author: Somayeh Hejazi, E-mail: dr.s.hejazi@gmail.com

ABSTRACT

Background: One important complication of diabetes mellitus is chronic, non-healing diabetic foot ulcers (DFUs). Although many new dressings are available for DFUs care in iran, very few high-level trials have been conducted that compare these dressing to determine which will provide the best level of care clinically. Considering the significant results of the new biodegradable and biocompatible dressings in the field of wound healing, we assessed to compare the clinical efficacy and acceptability of Acticoat™, chitosan-based biocompatible dressing (IPPISKIN dressing) and Amnion dressing for DFI wound.

Material and Methods: All of participants for this prospective, single-center, assessor-blind, controlled, randomized clinical trial had been recruited from the dermatology clinic of Shahid Beheshti University of Medical Sciences in Iran. After meeting the inclusion criteria the patients randomly selected to our three different dressing groups: treatment with ippiskin dressing, Acticoat dressing or Amnion dressing for 8 weeks.

Results: In all groups, the total 10-item DFI wound score reduced continuously through the course of study. The patterns of change of total 10-item DFI wound scores did not differ significantly over time between the three groups. All groups experienced significant reductions in the total 8-item DFI wound scores over the time of study.

Conclusion: The Ideal wound dressing should preferably be inexpensive, readily available with minimal storage requirements and long shelf-life. It would also be an advantage for the material to be hemostatic, transparent (to indicate the presence of infection), and biodegradable as it restores normal function to the skin.

Acute and Long - Term Skin Damage Due to Chemical Weapon

Seyyed Masoud Davoudi [1]

1. Associate Professor of Department of Dermatology, Baqiyatallah University of Medical Sciences

Corresponding Author: Seyyed Masoud Davoudi, E-mail: davoudi_sm@yahoo.com

ABSTRACT

Sulfur mustard (2,2-dichlorodiethyl sulfide: SM), the protagonist of vesicant chemical weapons, was first used in July 1917. Despite prohibition of its production and use by international conventions, it has been used in several conflicts. More than 100,000 soldiers and civilians were injured due to SM exposure during Iran-Iraq war (1980-1988). The acute skin lesions consist of erythema, edema, and blisters.

Skin xerosis and pruritus, pigmentation disorders, scars, and cherry angiomas are among the most common long-term skin lesions after contact with SM. Although SM is a well-known carcinogenic substance, skin cancers are rarely reported.

Skin is the first organ exposed to sulfur mustard (SM). The mechanism of SM-induced cutaneous injury has not been fully clarified so far, which is a major

obstacle to the development of effective treatments for SM-induced injury

So far, there is no satisfactory therapy for acute symptoms and long-term complications.

Sulfur mustard (SM) is a well-known chemical warfare agent with blister-forming property and is a close relative of Lewisite agent and nitrogen mustard. mustard,SM has been widely used in several great wars and primarily causes damages to the skin, eyes and lungs.

Laser Diode in Wound Healing (Why & How)

Abbas Majdabadi [1]

1. Laser & Optics Research School

Corresponding Author: Abbas Majdabadi, E-mail: amajdabadi@aeoi.org.ir

ABSTRACT

Throughout history, there have been many advances made in wound management. Research on new modalities to enhance wound healing is ongoing at most medical centers. One such modality is laser irradiation. Laser irradiation as a phototherapeutic means for the stimulation and/or acceleration of wound healing began in the 1970s by Mester and colleagues. In the past ten years laser diodes mostly have been used compared to other lasers in wound healing.

A laser diode, also known as an injection laser or diode laser, is a semiconductor device that produces coherent radiation (in which the waves are all at the same frequency and phase) in the visible or infrared (IR) spectrum when current passes through it. Light-emitting diodes (LED), or laser diode originally developed plant growth experiments in space show promise for delivering light deep into tissues of the body to promote wound healing and human tissue growth. This is one of the reason why semiconductor lasers is the best candidate for above mentioned target. Here is other advantages of laser diodes in medicine:

1- Variety of wavelengths

2- Small size and weight

3- Low current, voltage, and power requirements

4- Low intensity

5- Wide-angle beam

6- Low price

7- Long operation life time

8- Easly coupled to fiber

We should also consider laser diode is a highly sensitive light source. The perfect medical diode lasers have a current controllers, temperature controllers and mounts give user the most sensitive of control and measurement, whilst providing a high degree of protection to the laser diode by filtering out and suppressing static electricity, electrical surges, shocks and mains transients. They allow user to adjust the output power, wavelength and diode laser mode stability with high precision, resolution and stability. Now a days we are able to find an extensive selection of diode lasers, with output in the 375 - 2000 nm range and powers up to 3 W in both pulse and CW modes.

In this article we are going to mention what a laser diode is, how it is made and why we use it in wound healing.

Investigation of the Effective Parameters on the Wound Healing Process in Low Level Laser

Hossein Khosravi [1], Ahmad Ebadi

1. Assistant Professor of Medical Physics, Salamat Institute, Chamran Hospital, Tehran, Iran.

Corresponding Author: Hossein Khosravi, E-mail: hkhosravi55@gmail.com

ABSTRACT

This study aimed to systematically assess the parameter-specific effects of low-level laser therapy (LLLT) on the wound healing process. Despite diverse methods being applied to induce wound healing, many wounds remain recalcitrant to all treatments. Photobiomodulation involves inducing wound healing by illuminating wounds with light emitting diodes or lasers. Although LLLT used on different in vitro, animal models, and clinical trial, wound healing is induced by many different wavelengths and powers, but at this time not clarified optimal set of LLLT parameters identified.

Considerable variations and weaknesses in the study designs and laser protocols limited the inter study comparison and clinical transition. However, repeated irradiations have elicited which wavelengths in the red, near-infrared range and energy density below 16 J/cm2 have favorable responses. Current evidence showed that low level lasers with adequate parameters stimulated proliferation and modulated inflammation of the fibroblasts derived from human periodontal tissue. At the further time, in vitro studies with better designs and more appropriate study models and laser parameters are anticipated to provide for clinical studies and practice.

Keywords: Low Level Laser Therapy, Wound Healing, Laser Parameters

Laser Photobiomodulation in Prevention and Treatment of Radiodermatitis: Indications and Pitfalls

Nasrin Zand[1], Leila Ataie-Fashtami[2], Afshan Shirkavand[3]

1. Dermatologist, Assistant Professor of Medical Laser Research Center (MLRC), ACECR

2. Dermatologist, Assistant Professor of Department of Regenerative Medicine, Royan Institute for Stem Cell Biology& Technology, Medical Laser Research Center (MLRC), ACECR

3. Laser and Plasma Institute, Shahid Beheshti University, Medical Laser Research Center (MLRC), ACECR

Corresponding Author: Nasrin Zand, E-mail: zand_nas@yahoo.com

ABSTRACT

Radiation-induced dermatitis (RID) is one of the most common side effects of radiotherapy (RT). Approximately 95% of patients with sarcoma, breast, lung and head and neck malignancies experience RID which can be severe in 10% of cases.

Although various topical and systemic agents have been evaluated for preventing or minimizing the skin toxicity following RT, currently, there is no definite and standard prophylactic or therapeutic measures for RID. Because of lack of general consensus for prevention and treatment of RID, it is quite rational to obtain new prophylactic or therapeutic approaches in this field.

Low-level light therapy (LLLT, photobiomodulation therapy, laser phototherapy) is a noninvasive treatment option used to stimulate wound healing and reduce inflammation, edema, and pain. The application of laser phototherapy in an oncologic setting for supportive care of the patients has become an interesting field especially in the recent years. Laser phototherapy has been used for prevention and treatment of radiodermatitis. These studies showed that photobiomodulation could reduce the incidence and the severity of RD in breast cancer patients.

In spite of the interesting clinical results of LLLT in supportive care of oncological cases such as RD, oral mucositis and breast cancer-related lymphedema, the application of laser phototherapy has been withheld by many physicians because of the fear that LLLT might stimulate the proliferation of the remaining tumor cells after surgery and promote metastatic lesions.

On the other hand some other studies have proposed that laser phototherapy not only doesn't aggravate tumor growth but also it may even inhibit the tumor growth. Some investigations

propose the ability of laser phototherapy to reduce tumor progression by the induction of apoptosis of cancer cells, recruitment of immune cells, reduction the number of highly angiogenic macrophages within the tumor mass and promoting vessel normalization, an emerging strategy to control tumor progression.

In this review at first we discuss about the clinical effects of laser phototherapy on prevention and treatment of radiodermatitis and then we will review the literature to demonstrate the available scientific evidence that supports or contraindicates the applicability of laser phototherapy in this field and its pitfalls.

LASER and LED Effect on Wound Healing

Fariba Mansouri [1], Mahnaz Mansouri [2]

1. Gas Lasers Department , Laser and Optics School , N.S.T.R.I
2. Posteur Institue of Iran

Corresponding Author: Fariba Mansouri, E-mail: farimansi@yahoo.com

ABSTRACT

Clinical studies have shown low energy lasers to be effective to accelerate the healing of injured tissue. Although the beneficial effects of laser photo stimulation are now generally accepted, the mechanisms by which laser light facilitates wound healing and tissue repair are not clearly understood .The objective of this paper was to review and better understanding the role of low-intensity laser in the progression of tissue healing.

Keywords: Photo Stimulation, Wound Healing, Low Intensity Laser

Role of Hyperbaric Oxygen Therapy (HBOT) in Chronic Wound Management

Ahmad Ebadi [1], Hossain Khosravi [3]

1. Aerospace & Subaquatic Medicine Specialist, Associated Professor in Research Center of Defense Medicine ,Chamran Hospital, Tehran, Iran
2. Ph.D in Medical Physics, Associate Professor in Research Center of Defense Medicine, Chamran Hospital, Tehran, Iran

Corresponding Author: Ahmad Ebadi, E-mail: Ebadi1442@gmail.com

ABSTRACT

Hyperbaric oxygen therapy (HBOT) is a short-term , high dose oxygen inhalation and diffusion therapy, delivered systematically through airways and blood under high pressure by using hyperbaric chambers . HBOT stimulates angiogenesis , reduce edema , augments granulation tissue formation by enhancing fibroblast ,and improves leukocyte function by elevating the partial pressure of oxygen in tissue . Chronic wounds, defined as those wounds which fail to proceed through an orderly process to produce anatomic and functional integrity, are a significant socioeconomic problem. A wound may fail to heal for a variety of reasons including the use of corticosteroids, formation of squamous cell carcinoma, persistent infection, unrelieved pressure, and underlying hypoxia within the wound bed. Hypoxia appears to inhibit the wound healing process by blocking fibroblast proliferation, collagen production, and capillary angiogenesis and to increase the risk of infection. Among advanced therapeutic interventions for wounds , Hyperbaric oxygen therapy (HBOT) has the unique ability to ameliorate tissue hypoxia, reduce pathologic inflammation, and mitigate ischemia reperfusion injury . In this presentation we explain role of HBOT in chronic wound management by data collecting from review of journals in this field for previous ten years.

Keywords: Hyperbaric Oxygen Therapy , Chronic Wound , Hypoxia

Electrical Stimulation in Wounds at Risk of Compromised Healing

Siamak Bashardoust Tajali [1,2], Mohsen Fateh [2], Behroz Attarbashi Moghadam [3]

1. Assistant Professor, Department of Physical Therapy, Tehran University of Medical Sciences, Tehran, Iran

2. Medical Laser Research Center, Academic Center for Education, Culture and Research, Tehran University of Medical Sciences Branch, Tehran, Iran

3. Associate Professor, Department of Physical Therapy, Tehran University of Medical Sciences, Tehran, Iran

Corresponding Author: Siamak Bashardoust Tajali, E-mail: s_bashardoust@sina.tums.ac.ir

ABSTRACT

Background: Electrical stimulation is described as a safe noninvasive and possible effective intervention to accelerate wound healing. This is an easy to use method may help healing process in wounds, specifically wounds at risk of compromised healing. This review helps to critically evaluate results of the relevant qualified trials and effectiveness of different electrical stimulation modalities on delayed wound healing or wounds at risk of nonunion. Literature search shows that several types of electrical stimulation may apply to accelerate wound healing process. Most of these modalities have been reported effective for wound healing acceleration; however few of them were designed in a high quality basis. The human cell is reported as an electrical unit. Recent studies have shown that all living cells are under coverage of a plasma membrane that operates on electrochemical physiology based on exchange of the ions under effects of direct electrical currents. Bacterial load and infection tissue are important factors in chronic wounds and delayed healing. Bacterial colonization may associate with an infection and delayed wound healing.

Results: Electrical stimulation may help to accelerate wound area reduction. Types of electrical stimulation have been reported with higher proportion of healed tissue in 14 out of 17 wound randomized clinical trials. Type of electrical stimulation, frequency, intensity, waveform, and duration of therapy were reported vary in different studies.

Conclusion: Electrical stimulation has been shown to accelerate wound healing and may increase cutaneous perfusion in wounds at risk of compromised healing. Moreover, electrical stimulation may help results of plastic surgery and improve flap and/or graft survival. Beyond, electrical stimulation can be extensively applied to decrease risk of necrosis following specific surgeries such as foot reconstruction.

Keywords: Electrical Stimulation; Wound Healing; Compromised Healing; Infection; Diabetic Foot

Participating in Regenerative Medicine Clinical Trials: a Right or a Privilege?

Hamid Reza Bidkhori [1,2]

1. Stem Cells and Regenerative Medicine Research Group, Academic Center for Education, Culture and Research (ACECR)-Khorasan Razavi, Mashhad, Iran

2. AIDS, HTLV and Viral Hepatitis Research Group, Academic Center for Education, Culture and Research (ACECR)-Khorasan Razavi, Mashhad, Iran

Corresponding Author: Hamid Reza Bidkhori, E-mail: hbidkhori@gmail.com

ABSTRACT

Thanks to the beneficial impact of decades of bioethics, regenerative medicine clinical trials involving human participants is highly regulated and subject to precise ethical considerations. The priority of almost all of ethical codes is on protection of participants against harm that might result from research. However, less attention is given to the interests that patients may themselves have in participating in clinical trials. We consider that patients who are in need of regenerative medicine care, may have a strong interest in taking part in research with greater than usual risks. By accepting their RIGHT to participate, these studies can be both ethically and scientifically justified.

If we consider science as a social institution which helps us being healthy and is necessary for the prospering of society, then it may be arguable that as members of society we should have the right to participate in this institution, in the same way that we have the right to participate in government and social policy. The concept of 'science as democracy' and the associated idea of 'scientific citizenship' are becoming established in philosophical studies of science. In this respect, autonomy does not necessarily lead us to protect patients from risk, but instead supporting patients to take justifiable risks in regenerative medicine studies upon their demand. Currently most informed consent regulations are focused on the right of the patients NOT to participate: right to refuse and right to withdraw at any point. By considering patients as active agents making treatment choices and a shift from paternalism to autonomy, we also should respect their right to participate.

Management of Deep Sternal Wound Infection by Negative Pressure Wound Therapy with or without Water Jet Rather than Conventional Therapy

Hamid Reza Davari [1]

1. Department of Surgery, Tehran University of Medical Sciences, Tehran, Iran

Corresponding Author: HamidReza Davari, E-mail: h1h2hamid@yahoo.co.uk

ABSTRACT

Post sternotomy mediastinitis, also commonly called deep sternal wound infection, is one of the most feared complications in patients undergoing cardiac surgery. The overall incidence of post sternotomy mediastinitis is relatively low, between 1% and 3%, however, this complication is associated with a significant mortality, usually reported to vary between 10% and 25%. There is still no general consensus regarding the appropriate surgical approach to mediastinitis following open-heart surgery and a wide range of wound-healing strategies have been established for the treatment of post sternotomy mediastinitis during the era of modern cardiac surgery.

Conventional forms of treatment usually involve surgical revision with open dressings or closed irrigation, or reconstruction with vascularized soft tissue flaps such as omentum or pectoral muscle. Unfortunately, procedure-related morbidity is relatively frequent when using conventional treatments and the long-term clinical outcome has been unsatisfying.

Vacuum-assisted closure is a novel treatment with an ingenious mechanism. This wound-healing technique is based on the application of local negative pressure to a wound. During the application of negative pressure to a sternal wound several advantageous features from conventional surgical treatment are combined. Recent publications have demonstrated encouraging clinical results, however, observations are still rather limited and the underlying mechanisms are largely unknown.

Hydrotherapy or water jet therapy by the VERSAJET II system enables a surgeon to precisely select, excise and evacuate nonviable tissue, bacteria and contaminants from wounds, burns and soft tissue injuries. As the handpiece travels tangentially over the soft tissue surface it creates a smooth wound bed while reducing bacterial burden, preserving viable tissue, removing unwanted necrosis and debris. The

tissue preserving technique reduces time to closure which may reduce treatment cost.

With the rise in use of NPWT came an increased number of reported serious bleeding complications. The risk of heart injury, particularly the right ventricle, bypass grafts or great vessels is well known from conventionally treated patients. Infectious erosion, displacement of heart structures towards sternal margins, or tractions of fibrosis adhesion were identified as potential mechanism of injury. The incidence of these complications by conventional therapy was found to be between 2-14.8%. with data from a larger group of NPWT treated patients showing 2 to 5%, thus NPWT does not seem to increase the incidence of serious complications. Mortality from these complications varies between 25 to 70%, with emergency surgery as well as proper covering of mediastinal structures with interface dressing being crucial for management.

During my practice as a general thoracic surgeon I managed more than 300 cases with deep sternal wound infection with conventional therapy and some with new modalities. Now a days I use NPWT in 50 to 70 percent of cases mostly as a bridge to reconstruction and water jet for recalcitrant sternal wound infection. This review provides an overview of the historical development of conventional therapies and new era of wound management with NPWT and Hydrotherapy in post sternotomy mediastinitis.

Skin Problems Related to Breast Cancer

Ahmad Kaviani [1]

1. Professor of Surgery, Tehran University of Medical Sciences, Tehran, Iran

Corresponding Author: Ahmad Kaviani, E-mail: akaviani@tums.ac.ir

ABSTRACT

Breast Cancer is the most common cancer among women worldwide. Although skin involvement is an uncommon presentation of breast cancer, the skin can be affected in different steps of breast cancer management. Skin ulcers, skin edema, and skin masses can be seen as the initial presentations of the important disease. As soon as the diagnosis of breast cancer is made based on skin ulcers, chemotherapy would play the first and essential role in the management of the advanced disease.

The skin is mainly affected during the therapeutic phases of the disease from surgery, chemotherapy, and radiation therapy. Some complications of surgery like delayed healing in different types of surgery especially in oncoplastic and reconstructive surgery should be managed surgically. Skin can be damaged as drug induced complications in some types of chemotherapy drugs especially in the regimens containing Taxoter and its derivatives. Although these problems are mainly managed conservatively, in some situation the severity of the complication urges the oncologists to change the chemotherapy regimen. Meanwhile, the main and the most common problem induced to the skin, in the process of breast cancer, is radiation-induced dermatitis whether acute of chronic. Management of acute radiation dermatitis is not a big problem and it recovers mainly with conservative therapy while sever edema and fibrosis in the late and advanced conditions may not be easy to be managed. In these uncommon conditions mastectomy and reconstruction may be indicated.

Iatrogenic Ulcers

Mohammad Reza Ghassemi [1]

1. Assistant Professor, Department of of Dermatology, Iran University of Medical Sciences, Rasool Akram Hospital, Tehran, Iran

Corresponding Author: Mohammad Reza Ghassemi, E-mail: mohammadreza.ghassemi@yahoo.com

ABSTRACT

Iatrogenic ulcers are complications that occur as a result of medical treatment by physicians or other members of the health care team. The causes and severity of iatrogenic injuries vary, but in severe wound cases, consulting a plastic surgeon for wound treatment may be warranted.

Even though the quality of medical and surgical care has improved remarkably over time, iatrogenic injuries that require surgical treatment including injuries caused by cast and elastic bandage pressure, extravasation, and dopamine-induced ischemia still frequently occur.

Until now there has been no systematic long-term analytic study of iatrogenic complications. According to a recent retrospective clinical review on total 196 patients ,who were referred to the plastic surgery department for the treatment of iatrogenic injuries, an extravasation injury was the most common iatrogenic complication, followed by splint-induced skin ulceration, dopamine induced necrosis, prefabricated pneumatic walking brace-related wounds and elastic bandage-induced wounds.

Nowadays, with the increasing range of rehabilitation therapy, a significant increase in iatrogenic injuries caused by prefabricated walking braces is noted.

In summary; the awareness of the very common iatrogenic complications and its causes may allow physicians to reduce their occurrence and allow for earlier detection and referral to a plastic surgeon. Early identification of iatrogenic complications will assist plastic surgeons in developing more effective intervention protocols to improve patient care outcomes.

Novel Ideas in Minimal Invasive Approach to Maxillofacial Trauma for Large Wound Prophylaxis

Mohammad Reza Shafii [1]

1. Assistant Professor of Plastic and Reconstructive Surgery, Plastic, Reconstructive and Craniomaxillofacial Unit, Taleghani Hospital, Kermanshah University of Medical Science

Corresponding Author: Mohammad Reza Shafii, E-mail: shafii2008@yahoo.com

ABSTRACT

Background: Endoscopic approaches to maxillofacial trauma provide exciting new options for the management of facial fractures. This article reviews the current literature including new techniques, indications, and outcomes in endoscopic management of facial fractures and presents my experiences in these approaches.

Material and Methods: The transoral treatment of condylar neck and subcondylar fractures was performed in 80 patients from May 2010 to October 2015. Six months after surgery TMJ function was evaluated. Good TMJ function was noted 6 months after surgery. Mouth opening was measured to be more than 40 mm without deviation. Postoperative range of motion with a satisfying lateral excursion was found. I performed endoscopic fracture repair in ten patients with frontal sinus fracture and seven patients with zygomatic arch fracture and seven patients with orbital bone fracture. Good functional and cosmetic results obtained after these operations.

Results: The current literature suggests that, when compared with an open approach, smaller endoscopic incisions result in reduced patient morbidity with similar outcomes.

Conclusion: Endoscopic repair of facial fractures is a new and evolving technique that offers the potential for reduced patient morbidity and operating time, as well as quicker patient recovery.

Keywords: Endoscopic Approach, Maxillofacial Trauma, Facial Fractures

Clinical Application of Maggot Therapy to Treat Diabetic Foot Ulcer and Infection. What Are Contraindications?

Amir Reza Farhoud [1], Azam Malekian [2]

1. Orthopedic Surgeon, Tehran University of Medical Sciences. Tehran, Iran
2. Aboureyhan Clinic of Jahad, Tehran, Iran

Corresponding Author: Amir Reza Farhoud, E-mail: am_farhoud@yahoo.com

ABSTRACT

Background: Uncontrolled diabetes mellitus can lead to complicated infected foot ulcers that have all negative factors for healing. Although debridement and then proper coverage is a classic approach, these ulcers are accounted challenging for a surgeon because of ongoing infection and poorly vascularized tissues to transfer. This led to application of less invasive approach to reduce the secondary surgical injury by minimal debridement and implication of modalities like maggot therapy, vacuum assisted closure, biologic dressing and others.

Material and Methods: We treated 50 diabetic infected ulcers by different grades of Wagner classification during 18 months in Jahad Clinic for Diabetic foot. Exclusion criteria were fever, chills, large area of cellulitis (>2.5 cm around the ulcer), confusion, Blood Sugar > 300, giving up the serial sessions of treatment, and protruded dried uncovered bone. Simple x-ray and magnetic resonance imaging By a culture sample, appropriate oral antibiotic prescribed. After taking written informed consent, debridement of obvious necrotic soft tissue under pain-free and sterile condition was performed. Five to seven prepared maggot per cm2 was placed on the wound ad a wet sterile dressing was applied. After 48 for first session and 72 hours for next sessions the dressing was repeated until all area of the wound was covered by the granulation tissue and then routine dressing was applied. Failure of treatment was accounted as no progress of more than 2 sessions or progression of necrosis.

Results: Of 50 ulcers 18 ulcers including 10 toes of distal phalanx involvement and 8 of necrosis and vascular insufficiency (being pulseless) had failure of treatment. MRI of 22 patients showed osteomyelitis of the underlying bone of the ulcer; in nine osteomyelitis was deep (involved more than superficial) and failed to maggot therapy.

Conclusion: deep osteomyelitis, necrosis because of limb vascular insufficiency and ulcers of phalanx could be accounted as contraindications for maggot therapy.

Keywords: Diabetic Foot Ulcer, Maggot Therapy, Osteomyelitis

New Approaches in Keloids and Hypertrophic Scar Management

Mohammad Javad Fatemi [1]

1. Professor of Plastic and Reconstructive Surgery, Department of Plastic Surgery, Burn Research Center, St. Fateme Hospital, Iran University of Medical Sciences, Tehran, Iran

Corresponding Author: Mohammad Javad Fatemi, E-mail: mjfatemi@gmail.com

ABSTRACT

Keloids and hypertrophic scars are a challenging problem in plastic and reconstructive surgery. These abnormal processes are benign fibrous overgrowths of scar tissue, which results from an abnormal response to trauma. Several therapeutic modalities have been described for the treatment and prevention of these conditions that includes pressure and silicon therapy, steroid injection and surgery, but the optimal management approach has not yet been defined. This article reviews the most recent, innovative, therapeutic strategies for the management of hypertrophic scars and keloids, including Bleomycin, 5-FU, mitomycin-C, tamoxifen citrate, methotrexate, imidazolaquinolines, retinoids, calcineurin inhibitors, phenylakylamine calcium channel blockers, botulinum toxin, vascular endothelial growth factor inhibitors, hepatocyte growth factor, basic fibroblast growth factor, interleukin-10, manosa-6-phosphate, transforming growth factor beta, antihistamines, and prostaglandin E2.

Scar Prevention and Treatment

Farhad Hafezi [1]

1. Professor of Plastic and Reconstructive Surgery, Department of Plastic Surgery, St. Fatima Hospital, Tehran, Iran

Corresponding Author: Farhad Hafezi, E-mail: fhafezi32@gmail.com

ABSTRACT

From precise aesthetic work to most challenging reconstructive cases, preventing and treating problem scars are key to patient satisfaction and good surgical outcomes.

Understanding scarring determines our surgical planning, our approach, and our technique. Minimizing scarring can lead to both improved form and function. In this presentation I try to share my experience on scar management with colleagues. My talk includes; assessing scars, scar biology, conditions of excessive scarring, like hypertrophic scar and keloid

I also discuss methods of prevention, surgical technique, patient-specific factors, adjunct therapy and available remedies. I present the current methods of treatment for hypertrophic scar and keloid and also emerging treatments in this field.

Indications and techniques for scar revision, postoperative care and follow-up managements are included. At the end I will show few slides of techniques I used frequently in the past 30 years to fight the unsightly scar appearance especially in burn victims.

Wound Management in Iran

Mahnoush Momeni [1]

1. Assistant Professor, Department of Plastic Surgery, Iran University of Medical Sciences (IUMS), Tehran, Iran

Corresponding Author: Mahnoush Momeni, E-mail: mah_momeni@yahoo.com

ABSTRACT

in our country like whole the world, one of the important problems in our patients is “wound optimal management”. There is some wound care clinic in the cities which are center of provinces. These clinics are only in big cities. The team who work in these clinics are health care professionals consists of nurses, physicians who have different especiality: endocrinologists ,dermatologist ,general surgeon infectious disease specialist.

The goal of these centers is correct wound management.one of the aims of these centers is increasing the level of knowledgement of the patient.

In these centers we manage the wound base on standard treatment options.

The demographic criteria of the patient, past medical history, the duration of wound, and assessment of function of organs would be done.

The health care professionals in these clinics try to practice base on the references.

Pressure, Neuropathic and Diabetic Ulcers

Azadeh Goodarzi [1]

1. Assistant Professor of Dermatology, Department of Dermatology, Iran University of Medical Sciences (IUMS), Rasool-Akram Hospital, Tehran, Iran

Corresponding Author: Azadeh Goodarzi, E-mail: azadeh_goodarzi1984@yahoo.com

ABSTRACT

A pressure ulcer is defined as: "A localized injury to the skin and or underlying tissue usually over a bony prominence, as a result of pressure, or pressure in combination with shear."

Neuropathic ulcers form as a result of peripheral neuropathy, typically in diabetic patients. Local paresthesias, or lack of sensation, over pressure points on the foot leads to extended micro-trauma, breakdown of overlying tissue, and eventual ulceration. In addition, neuropathy can result in minor scrapes or cuts failing to be properly treated and eventually developing into ulcers.

A diabetic foot ulcer is defined as: "A full-thickness wound below the ankle in a diabetic patient, irrespective of duration. Skin necrosis and gangrene are also included in the current system as ulcers".

Diabetes has been the silent killer disease for many years and on the rise due to an increase in our body mass index. One of the most reported complications with diabetes is lower limb ulceration and amputation. The pathophysiology leading to ulceration is not fully understood but pressure and neuropathy considered etiologically important in diabetic ulcers. However ulceration has been associated with several risk factors which are neuropathy, ischemia, foot musculoskeletal deformity resulting in an increase plantar pressure at the site of deformity. Patient with more than one risk factor is at a higher chance of developing foot ulcers and for this reason the patient should be assessed thoroughly in regards to their medical history when being evaluated by a specialist.

The management of diabetic foot ulcers requires offloading the wound by using appropriate therapeutic footwear, daily saline or similar dressings to provide a moist wound environment, debridement when necessary, antibiotic therapy if osteomyelitis or cellulitis is present, optimal control of blood glucose, and evaluation and correction of peripheral arterial insufficiency.

Wound coverage by cultured human cells or heterogeneic dressings/grafts, application of recombinant growth factors, and hyperbaric oxygen treatments also may be beneficial at times, but only if arterial

insufficiency is not present.

Physicians of diabetic patients with ulcers must decide between the sometimes conflicting options of (1) performing invasive procedures (eg, angiography, bypass surgery) for limb salvage and (2) avoiding the risks of unnecessarily aggressive management in these patients, who may have significant cardiac risk. In general, the greatest legal risks are associated with delay in diagnosis of ischemia associated with diabetic ulceration, failure to aggressively debride and treat infection, and failure to treat the wound carefully.

If a patient presents with a new diabetic foot ulcer, he or she should receive care from physicians, surgeons, podiatrists, and pedorthotists who have an active interest in this complex problem. In the next step, management of systemic and local factors is of significant importance.

Atypical Wounds; Hidradenitis Suppurativa

Ali Mehdizadeh [1]

1. Dalla Lana School of Public Health, University of Toronto

Corresponding Author: Ali Mehdizadeh, E-mail: ali.mehdizadeh@mail.utoronto.ca

ABSTRACT

Hidradenitis Suppurativa (HS) is a painful, chronic and recurrent inflammatory skin disorder affects patient in their most productive time of life. It imposes direct and indirect costs to healthcare system (Mehdizadeh, 2015). The prevalence of HS rang from <1% to 4% in different populations (Jemec, 2012). The impact of HS on patient's quality of life and work productivity is extensive and yet remains understudied and underestimated (Alavi, 2015).

HS has a phenotypic heterogeneity within the disease spectrum and commonly presents as recurrent, painful, deep-seated acneiform eruptions and fistulas primarily in the axillary, inguinal, and anogenital regions. Historically, HS has been described as a disorder of apocrine glands, but the primary pathogenesis is currently linked to the hair follicle (Ingram, 2013). Further epidemiological data are required to identify the risk factors and true prevalence of HS.

HS commonly occurs in post pubertal females, with average age of onset in the second or third decades of life (Alavi, 2015), typically during the patient's most productive years of life. Consequently, HS results in economic and psychological disability in addition to the physical problems (Kromann, 2014). Compared to other dermatological diseases, (e.g. including alopecia, mild to moderate psoriasis), HS patients suffer from the greatest impairment in their quality of life (Alavi, 2015).

In spite of being an important health problem, the pathogenesis of HS is not completely understood and treatment protocols are based on a few randomized trials (Kromann, 2014). Currently, there is no confirmatory laboratory or histological test for HS and therefore the diagnosis is primarily clinical (Von der Werth, 2000). In addition, there is no single therapy that is effective for HS; therefore, treatment modalities are varied depending on the patient's clinical presentation (Dufour, 2014). The management of HS remains challenging, with many unanswered questions regarding both medical and surgical options. Although an increasing body of evidence suggests that the role of surgical excision is the most effective treatment for severe or advanced HS, the chronicity of the HS and the role of genetic and inflammatory characteristics need to be considered for choosing the treatment strategy (Mehdizadeh, 2015). Different treatment protocols recently published for management of HS; however, the current data indicate that there is a need for randomized, controlled clinical trials to identify the most effective HS treatment option.

Brachioplasty; The Most Challenging Scar in Plastic Surgeries

Abtin Jian [1], Reza Kassir , Martitska

1. Aesthetic Medical Practitioner

Corresponding Author: Abtin Jian, E-mail: abtinjian@gmail.com

ABSTRACT

Reducing the scar to a minimum in surgical operations, especially cosmetic surgeries, are considered to be one of the most important challenges of the surgeons.

Among all, brachioplasty surgery is of utmost importance and owns a particular and special place. Because this scar exclusively exposes all phenomenon that may be revealed during different stages of restoration, such as proliferative inflammatory phase and maturity. A selection of phenomenon such as maceration, dehiscence, infection, hypertrophic scar, keloid scar, hypotrophic scar, hyperpigmentation, hypopigmentation and contracture scar.

Understanding the causes of these phenomenon, having a comprehensive, pre organized and scheduled plan, along with observation on “prevention prior to treatment” fact, leads to excellent results in controlling these phenomenon and gaining high level of patient satisfaction.

Alert patient selection and considering his health level (BMI), choosing appropriate technique in reducing scar length and concealing it in special areas, exact operation performance, applying professional wound dressing, precise monitoring of the healing process, botolium poison injection, performing PDL laser treatment and on time injection of corton and MTX based on a specific timeline, are a number of proceedings that will be pointed out later on in this essay.

Results: According to the nature of brachioplasty scars, this scar is known to be the most challenging one in surgical operations. Therefore, with the assumption that all phenomenon will be revealed at different stages of the operation, the surgeon should make the necessary actions beforehand in order to prevent their outbreak, using a personal protocol which is presented in this essay.

New Insight Roles of Insulin in Wound Healing Process: Mechanism of Action and Pharmaceutical Applications

Leila Novin

Endocrinologist, Multidisciplinary Wound Clinic, Academic Center for Education Culture and Research, Tehran, Iran

Corresponding Author: Leila Novin, E-mail: dr.lnovin@yahoo.com

ABSTRACT

Skin is a complex tissue, Which comprises multiple Layers. An injury to this stratified structure is considered to be the beginning of a sequence of events designed to restore skin integrity. Depending on the diameter and severity of a wound, deleterious physiological and metabolic changes can occur, Leading to impaired wound healing and increased morbidity and mortality . While wound dressings provide some from of protection and remedy, the main challenge is to restore local metabolic pathways to normality, especially in comprised patient suffering from chronic illness, such as diabetes. The implications of this disease in particular have prompted investigations into topical insulin as a potential and promising therapeutic intervention. This mimi-review describes the possible mechanisms of insulin that are responsible for stimulating the cellular and moleculare pathways, thereby enhancing the wound healing process. Examples of systemic and topical insulin applications are mentioned, together with an evaluation of the critical role played by insulin in tissue regeneration.

Assessment of Nursing Roles of Bedsore Prevention in Intensive Care Units: Systematic Review

Kobra Esfandani

MSc. in Intensive Care Nursing Candidate, Critical Care Medicine Group, Faculty of Nursing, AJA University of Medical Science, Tehran, Iran

Corresponding Author: Kobra Esfandani, E-mail: esfandani.k2@gmail.com

ABSTRACT

Background: Bedsore is a serious complication fore hospitalized patients. Prevention of bedsore is considered as a priority in acute and long-term care in intensive care units. It is purpose pattern quality nursing care. This study aimed to determine the effect of nurse's role in prevention of pressure sore in intensive care units.

Findings: Prevention of bedsore is considered as a priority nursing care. Whereby has cost abound for patient, family, hospital, social sanitarian and society. With creation any bedsore (%50) increase nurses work as if addition 4/31 daytime hospitalization.

Material and Methods: This article is a review study and information compiling has been done with the use of Google scholar–PubMed- Sciences direct databases of the years 2000-2016.

Conclusion: nurses do play important role in prevention, treatment bedsore and incidence in hospitalized patients in intensive care units. Nursing team members are responsible for direct and continuous care related to pressure sore and treatment.

Keywords: Bed Sore, Prevention, Nursing Care, Intensive Care Unit.

The Roles of Nutrition in Wound Healing

Kurosh Djafarian [1]

1. Associate Professor, Department of Clinical Nutrition, School of Nutritional Sciences and Dietetics, Tehran University of Medical Sciences

Corresponding Author: Kurosh Djafarian, E-mail: kdjafarian@tums.ac.ir

ABSTRACT

Wound management is a complex process which has a very large social and health burden on the community as well as individuals. There are limited evidence-based documents for the role of nutrition in wound healing and wound care practices. However, we know that nutrition plays an essential role in the management of patients with wounds and decreasing the mortality and morbidity associated with chronic wounds. Adequate nutrition can improve immune function, collagen creation, and wound tensile strength that allow progression through stages of wound healing. Poor nutrition may compromise the whole wound healing process. Given the clear association between nutrient deficiencies and poor wound healing, the true influences of food supplement on the biochemical processes necessary for wound care is relatively unknown. The majority of researches suggesting that the nutritional status of patients should be evaluated before any dietary and food supplement interventions. The available data show that when the sufficiency of energy and protein is met, additional micronutrient intake above the RDA recommendations may not be necessary. However, many reviews support the potential benefits of several nutrients such as arginine, glutamine, and zinc in the wound-healing process. In addition, further trials are needed to establish possible impacts of vitamin D, selenium, iron, and essential fatty acids in wound healing.

Keywords: Wound, Nutrition, Nutrient

The Roles of Off-Loading and Total Contact Casting in Management of Neuropathic Diabetic Foot Ulcers

Maeve Kelly [1]

1. Derma Sciences, Managing Director E.M.E.A – United Kingdom

Corresponding Author: Maeve Kelly, E-mail: a.malekan@iranpharmis.org

ABSTRACT

Diabetes is an ever increasing phenomenon in the world.

Of Diabetic patients, it is accepted that 15-25% of these patients will develop a diabetic foot ulcer1

Patients with diabetes are 22 times more likely to undergo a non- traumatic amputation than an individual without diabetes2

85% of lower extremity amputations (LEA) in diabetic patients are preceded by a foot ulcer3.

Diabetic foot ulcers result in considerable morbidity and mortality. Armstrong et al (2007) examined the 5-year mortality rates for neuropathic and ischemic diabetic foot ulcers, diabetes-related amputations, and various other conditions including some common types of cancer. Approximately half the patients receiving a diabetes-related amputation will die within 5 years.

Prostate and breast cancer are disease states that now have a standard of care so the approach to treatment is more consistent and evidence-based. Previously, the mortality rates for these conditions were much higher.

The treatment priorities to treat DFU are:

- Adequate Perfusion
- Infection Control
- Wound debridement
- Off-loading/ shear reduction
- Blood Glucose control

- Patient education / compliance

TCC is supported by level I evidence. Including numerous RCTs, two meta-analyses, consensus documents and the Cochrane review.4-13

The 2013 Cochrane review states: “Non-removable casts provide the most effective pressure relieving intervention for the healing of diabetic foot ulcers.”

Consensus Recommendations on Advancing the Standard of Care for Treating Neuropathic Foot Ulcers in Patients with Diabetes stated:

“From a practical standpoint, more widespread adoption of effective off-loading modalities would make the most improvement in DFU healing.”

“The TCC is the ideal method and is supported by the highest level of evidence”

ADA Consensus Statement on The Charcot Foot in Diabetes stated:

“Off-loading at the acute active stage of the Charcot foot is the most important management strategy and could arrest the progression to deformity. Ideally the foot should be immobilized in a non-removable total contact cast (TCC)…”

Evidence of 8 RCTs & Meta-analysis proving % healed and days to heal (one of the 8 RCTs did not report % healed), see below:

1. Cavanagh PR, Owens TM. Nonsurgical strategies for healing and preventing recurrence of diabetic foot ulcers. Foot and Ankle clinics N Am 11:735-743, 2006

2. Armstrong DG, et al . Off-loading the diabetic foot wound. Diabetes Care 24:1019-1022, 2001.

3. Mueller NJ, et al. Effect of Achilles tendon lengthening on neuropathic plantar ulcers.Journal of Bone and Joint Surgery 85-A:8; 1436-1445, 2003.

4. Katz IA, et al. A randomized trial of two irremovable off-loading devices in the management of plantar neuropathic diabetic foot ulcers. Diabetes Care 28:555-559, 2005.

5. Piaggesi A, et al. An off-the-shelf instant contact casting device for the management of diabetic foot ulcers. Diabetes Care 30:586-590, 2007.

6. Mueller NJ, et al. Total contact casting in treatment of diabetic plantar ulcers; Controlled clinical trial. Diabetes Care 12:384-388, 1989.

7. Caravaggi C, et al. Effectiveness and safety of a nonremovable fiberglass off-bearing cast versus a therapeutic shoe in the treatment of neuropathic foot ulcers.Diabetes Care 23:1746-1751, 2000.

8. Armstrong DG, et al. Evaluation of removable and irremovable cast walkers in the healing of diabetic foot wounds. Diabetes Care 28:551-554, 2005.

9. Mueller NJ, et al. Effect of Achilles tendon lengthening on neuropathic plantar ulcers, Journal of

Biomechanics. June 2004

Studied comparing healing rates of TCC vs Negative Pressure and Graft also proved TCC to be the Gold Standard of care.

30 day healing estimates noted the success rate of TCC at 30 days vs other modalities at 30 days. Why not use TCC first line every time?

NEW CONSENSUS DOCUMENT JANUARY 2015[15]:

The management of diabetic foot ulcers through optimal off-loading included 9 KOL PANEL MEMBERS and they stated:

1. Off-loading with casts as well as aggressive off-loading with other studied methods need to be more widely adopted in clinical practice

2. Due to the increased likelihood of healing, TCC is recommended as the preferred method for effective pressure relief. Newer, easier to apply cast should considered to overcome barriers to use

3. More education is needed for the clinician and the patients to increase off-loading use and compliance

Cost effective: Costs for healing ulcers are high and even higher for ulcers resulting in amputation, due to prolonged hospitalization, rehabilitation, and need for home care and social service for disabled patients[16].

Hence the proven need and Gold Standard of Care for treating DFU's is to use a non-removable TCC.

TCC-EZ allows this treatment to be adopted in a fast, efficient way in the Wound Care clinic by the Podiatrist or Nurse or Doctor as it is a roll-on system which can be applied in under 10 minutes.

Chronic Wounds are a Problem

Reza Afshar

MSc. in Nursing, Registered Nurse and ET Nurse, USA

Corresponding Author: Reza Afshar, E-mail: r.afshar@iliadarman.com

ABSTRACT

Non- healing are a significant problem for health care system and patients all over the world. 1-1.5 % of the population in industrialized countries have a wound.

Wound treatment cost between 2-4 % of health care budget and due to demographic changes and rise in diabetes, chronic wounds will increase.

30% of chronic wounds never heal. Non healing wound are the most expensive.

Yet after 50 years of research, many wounds today are still mismanages using out dated practices.

There are a lot of myths associated with wound healing. Despite a strong evidence base, many wounds are dressed using treatments that slow down the healing process.

Bioimplant Dressing in Comparison with Wet Dressing for Treatment of Diabetic Foot Ulcers

Alireza Firooz [1], Zeinab Variji [1], Yahya Dowlati [1], Hamed Zartab [1], Pedram Mehrian [1], Zohreh Annabestani [2], Mohammad Reza Mohajeri Tehrani [2], Bagher Larijani [2]

1. Center for Research and Training in Skin Disease and Leprosy, Tehran University of Medical Sciences, Tehran, Iran
2. Endocrinology and Metabolism Research Center, Tehran University of Medical Sciences, Tehran, Iran

Corresponding Author: Alireza Firooz, E-mail: alifiruz@yahoo.com

ABSTRACT

Background: We aimed to evaluate the efficacy of bioimplant dressing in comparison with wet dressing in diabetic patients with foot ulcers.

Material and Methods: Diabetic patients with a Wagner classification grade of 2, 3 or 4 ulcer were included in this controlled clinical trial. This study was conducted in the department of diabetic foot center affiliated with the Research Institute of Endocrinology, Tehran University of Medical Sciences between Nov, 2010 and March 2012. Fifty eight cases with diabetic foot ulcer were equally and randomly divided in to control and test group. Bioimplant group received amniotic membrane dressing while control group had wet dressing. They were evaluated once a week for 6 week duration for epithelialization and granulation tissue of the wound.

Results: The complete healing rate (wound closure) in the whole study population was 33.73% (control group = 9.6%, bioimplant group = 24.13%), $P<0.005$). In 28 (96.55%) patients of bioimplant group granulation tissue were extended within 3rd visit. Neuropathy improvement were detected in 25(86.2%) of bioimplant group versus 4 (13.79%) of the control group.

Conclusion: Bioimplant dressing was superior to wet dressing in prompting the complete healing of diabetic foot ulcers significantly. Ease of use, absence of adverse effects and facilitated wound healing of amniotic membrane make it a proper dressing in the management of diabetic foot ulcers.

Psychological Aspects of Wound Healing

Mohammad Arbabi [1]

1. Associate Professor of Psychiatry, Tehran University of Medical Sciences. Tehran, Iran

Corresponding Author: Mohammad Arbabi, E-mail: marbabid@gmail.com

ABSTRACT

Recently, there has been a substantial increase in the volume of published work regarding the psychosocial issues in wound care, but we are still only scratching the surface of understanding the ways in which psychosocial elements impact healing or affect the ways in which individuals cope with long-term wound related problems.

Several recent studies report that chronic wounds pose a threat to physical functioning and have a negative impact on psychological functioning, and to a lesser degree, on social functioning.1–6 Major limitations reported in these studies were pain and immobility, followed by sleep disturbance, lack of energy, limitations in work and leisure activities, worries and frustrations, and a lack of self-esteem. Patients have a significantly poorer quality of life compared to healthy people. The specific reasons for the poor levels of health-related quality of life are multi-factorial and include: frequency and regularity of dressing changes, which affect a patient's daily routine; a feeling of continued fatigue due to lack of adequate sleep; restricted mobility; persistent pain; wound infections; and social isolation. The requirements and consequences of having a chronic wound also have an enormous impact on the patient's social life, as well as the lives of their caregivers. The loss of independence associated with functional decline can lead to several, sometimes subtle, changes in overall health and wellbeing. These changes include altered eating habits, depression, social isolation, and a gradual reduction in activity. The presence of these factors, along with immobility, not only influences the occurrence of further wounds but also exacerbates their severity and jeopardises their ability to heal.

Within wound care management we must be careful to ensure that the patient remains the centre of our focus and that all aspects of wound management are considered a package of care that reflects a consideration of the person, as well as the wound

Evaluation of Episiotomy Wound Infection in Motahari Hospital of Urmia at 1394

Mahnaz Mohammadpouri [1], Ziba Delnavaz, Mehrnaz Shahriar Afshar, Zahra Ahmadnezhad, Nasrin Ali Nezhad, Iran Khalili, Farahnaz Ghaderi

1. MSC, Motahari Teaching Hospital, Urmia University of Medical Sciences, Urmia, Iran

Corresponding Author: Mahnaz Mohammadpouri, E-mail: mohamadpouri.m@gmail.com

ABSTRACT

Background: Episiotomy after cutting the umbilical cord at birth is the most common surgical procedure. The following benefits are the routine Episiotomy, severe perineal laceration, fetal trauma and urinary stress reducing. Nevertheless, some studies have shown that this surgery had no benefit for the mother and result in unnecessary pain perineal region, incontinence of urine and feces, hematoma, infection, and damage to the wound region. This study aimed to evaluate the episiotomy wound infection in Motahari Hospital of Urmia was conducted in 1394.

Material and Methods: To do this cross-sectional study that episiotomy were all normal deliveries in 1394 were examined and those who were infected were identified epigenetic place then the data were analyzed by INIS[1] system software, and data mining software and using descriptive statistics.

Results: The mean age of participant was 28.5 years and the mean number of days of rehospitalization due to infection was 6. Results showed that the rate of incision of episiotomy in delivery was about (56.14%). Amang them (56.45 %) was in the nulliparous women and (43.85 %) was in the multiparous women. The rate of episiotomy wound infection was (0.61%).

Conclusion: Routine episiotomy should be set aside and used selectively in cases where the risk of rupture is high to be replaced and to reduce it to less than 30 percent, according to the Ministry of Health recommendations can be complications, including infection and episiotomy pain from episiotomy scars can also be reduced.

Keywords: Episiotomy, Wound Infection, Normal Delivery

1. Iran Nosocomial Infections Surveillance Software

New Approaches in Prevention and Management of Pressure Ulcer in Cardiac Patients

Bahram Ghaderi [1,2]

1. Ph-D in Surgical Nursing-Hacettepe University of Ankara, Ankara, Turkey

2. Teaching Supervisor and Wound Manager in Shahid Madani Heart Hospital, Tabriz, Iran

Corresponding Author: Bahram Ghaderi, E-mail: ghaderi_b47@yahoo.com

ABSTRACT

Background: Pressure ulcers are a significant problem for patients and health care providers worldwide. cardiac especially post cardiac operative patients, because of having more risk factors than other patients, are at extremely high risk of pressure ulcers. Using a standard risk assessment tool and paying attention to the main risk factors of pressure ulcer and updating knowledge and practice in prevention and management can be a useful method for identifying the high-risk patients in admission in order to prevent them from developing such ulcers. Interdisciplinary Pressure Ulcer Prevention team can identify high risk patients and control or manage them correctly.

Material and Methods: Pressure Ulcer (PU) is defined as an area of localized destruction to the skin and underlying tissue caused by unrelieved pressure for longer periods than soft tissue can tolerate, shear, friction, moisture or a combination of these factors during the patient's hospital stay. Exposure of the tissues to prolonged pressure in excess of capillary pressure inhibits circulation and limits normal exchange of oxygen and other substances, thus resulting in cellular metabolism disruption and ultimately tissue destruction. PUs develop on bony prominences of the body such as the ear, heels, elbows, back of head, sacrum, shoulder, and/or the spine and they can range from mild minor skin reddening to severe deep craters down to muscle and bone. Due to its significant impact on patient outcomes and the cost associated with its treatment, the Agency for Healthcare Research and Quality (AHRQ) has listed stage III and IV HAPU as a 'never event.' Cardiac patients may be at particularly high risk for PU (bed sore and device related pressure ulcer) development. Although the precise mechanisms that led to this increased prevalence are not entirely understood, underlying vessel disease, poor ventricular function, and heart failure are known to diminish the cardiovascular system's ability to react to pressure. In addition, hemodynamic instability and coexisting comorbid conditions, probably contribute to increased risk levels in the cardiac population. Additionally, age, diabetes, and hypertension are contributing factors in these patients. Cardiac surgery patients become extremely susceptible to pressure ulcers, and need to more attentions.Risk Factors in Cardiac OR include length of time on the operating table, Type of Cardiac surgery, Type of operation(On or Off Pump) , Time in anesthesia, Time in surgery, use of Vasopressors,

Hypothermia (duration). Risk Factors in Cardiac ICU include Low BP in ICU admission, use of Vasopressors, Sedatives and Narcotics , MV, IABP, Restraint, and low score of GCS. Using a standard risk assessment tool and paying attention to the main risk factors of pressure ulcer and updating knowledge and practice in prevention and management can be a useful method for identifying the high-risk patients in admission in order to prevent them from developing such ulcers. Pressure ulcer prevention is a nursing practice priority across all care settings. Although the prevention of pressure ulcers is a multidisciplinary responsibility, nurses play a major role. High PUs prevalence rates have been linked to poor or inappropriate knowledge and education. Researches showed that the incidence of Stage I and Stage II PUs decreased following nurses attending an educational session on skin assessment and the subsequent implementation of prevention protocols.

Risk Assessment, Comprehensive Skin Assessment, Minimize pressure friction and shearing, Manage incontinence / moisture, Skin Care and Microclimate Control, Pressure Redistribution or Mechanical Off-loading, Support Surfaces, Manage of nutrition and hydration needs, Assessment and management of pain, Provide patient and family members education are essentials of prevention and management of Pressure Ulcers, and must be Implemented in Hospitals, especially in CCUs and ICUs. Team (Skin Champions Team) approach to pressure ulcer prevention decreases rates of pressure ulcer. An innovative interdisciplinary Pressure Ulcer Prevention team establishes to identify high risk patients. The role of the skin champion manager is to provide expert knowledge, education, data collection and first-line peer consultation on pressure ulcers. The role of other team members is implementation of interventions on patients. education, competency, skills and validation necessary for skin champion members.

Conclusion: Pressure ulcer training and education is a fundamental component of pressure ulcer programmes which promote awareness of pressure ulcer prevention and best practice Best way to decrease development of pressure ulcer and their management if occurs, is estabilishment of pressure ulcer prevention and control team.

Keywords: Pressure Ulcer, Cardiac Patients, Risk Factors, Prevention, Team Approach

Treatment of Pressure Ulcers in Iranian Traditional Medicine: Comparative Study with Modern Medicine

Yasaman Vahedi-Mazdabadi [1], Elahe Karimpour-Razkenari [1], Mina Saeedi [1,2], Mohammad Toushih [3], Tahmineh Akbarzadeh [1,4], Mohammad Reza Shams Ardekani [1,5]

1. Persian Medicine and Pharmacy Research Center, Tehran University of Medical Sciences, Tehran, Iran

2. Medicinal Plants Research Center, Faculty of Pharmacy, Tehran University of Medical Sciences, Tehran, Iran

3. Electrophysiology Research Center, Tehran University of Medical Sciences, Tehran, Iran

4. Department of Medicinal Chemistry, Faculty of Pharmacy, Tehran University of Medical Sciences, Tehran, Iran

5. Department of Pharmacognosy, Faculty of Pharmacy, Tehran University of Medical Sciences, Tehran, Iran

Corresponding Author: Yasaman Vahedi-Mazdabadi, E-mail: yasaman.vahedi@gmail.com

ABSTRACT

Background: Pressure ulcers are injuries of the skin as a common clinical complication, especially among hospitalized people in different health contexts. It normally occurs on bony prominence sites and mainly due to limited mobility and physical activities. Pressure ulcers are serious public health issues and can be complicated by pain and infections leading to high economic burden. From Iranian traditional medicine point of view, ulcers are divided into different types and herbal remedies are provided accordingly. This study has discussed treatment of pressure from Iranian tradition medicine point of view. Also, it has compared the results with those obtained in modern medicine.

Material and Methods: All data for this review were obtained by search engines such as Google Scholar, Pub Med, SID, and Iranmedex using key words including "pressure ulcers" and "treatment". Also, manual search was conducted using Iranian traditional medicine resources such as "Qanun-fil-Tibb'', "Exir-e-Azam", and "Tibb Akbari".

Results: The management of pressure ulcers in the modern medicine is usually achieved by wound dressings, debridement, hydrocolloid and polyurethane films, alginate, hydrofiber and silver, nano crystalline silver, negative pressure wound therapy, hyperbaric oxygenation, water-filtered infrared-A, infection management, adjunctive therapies, and reconstructive surgery. However, the comparative efficacy and costs of each strategy indicate that there is limited evidence for complete amelioration of the pressure ulcers. In this regard, herbal remedies have attracted lots of attention and plants such as Dragon's Blood (Daemonorops draco), Turmeric (Curcuma longa), Aloe vera (Aloe barbadensis miller), Gallnut (Quercus brantii lindl), St. John's wort (Hypericum perforatum), and Nightshade (Solanum dulcamaral)

have been frequently used for wound healing in Iranian traditional medicine.

Discussions: Pressure ulcers have emerged as a controversial issue in wound care treatment and management. They have also imposed a substantial burden on the economy of the societies. In this respect, frequently used herbal remedies in Iranian traditional medicine have demonstrated versatile properties. They have played important role in circulation, tissue regeneration, relieving pain, stopping bleeding.

Conclusion: It seems that herbal medicine causes rapid wound closure leading to the development of new agents for pressure ulcer which reduces length of hospital stay and the corresponding financial burden for people and societies.

Keywords: Pressure Ulcers, Herbal Medicine, Iranian Traditional Medicine

Bedsore: Prevention and Treatment in Iranian Traditional Medicine

Aniseh Saffar Shahroodi [1], Laila Shirbeigi [2]

1. Department of Traditional Persian Medicine, School of Medicine, Shiraz University of Medical Sciences, Shiraz, Iran
2. Department of Traditional Persian Medicine, School of Traditional Medicine, Tehran University of Medical Sciences, Tehran, Iran

Corresponding Author: Aniseh Saffar Shahroodi, E-mail: anisehsaffar@yahoo.com

ABSTRACT

Background: Bedsores that also called pressure ulcers are injuries to the skin and underlying tissue resulting from prolonged pressure on the affected area. An estimated five percent of all hospitalized patients develop at least one pressure ulcer. People with the most risk factor of bedsores are those with a medical condition that limits their ability to change positions, requires them to use a wheelchair or confines them to stay on bed for a long time.

Bedsores can develop quickly. They are often difficult to treat. Taking care of bedsores imposes a huge economic burden on communities. However, injured tissue is always at risk of developing infections, which can spread and lead to serious illness. They can sometimes be serious and fatal. According to Iranian Traditional Medicine (ITM), there are several herbal medicines which can help prevention of bedsores. Philosophers believed that where bedsores are concerned, prevention is better than cure.

Material and Methods: This is a narrative review article which has reviewed ITM medical textbooks, such as "Qanoon", "Exir-e-azam", "Kamel al-sanaat al-tebbieh" and "Zakhireh kharazmshahi" as well as scientific references and data bases of conventional medicine (ISI, Pub med ,…) with specific keywords related to bedsore. Contents and related concepts were classified and results prepared.

Results: Bedsores can be caused by a number of factors, including friction and unrelieved pressure. Anyone who cannot change position without help can develop bedsores. Therefore pressure ulcers are a constant risk for patients who are paralyzed, injured, ill or very old and frail. Bedsores most often develop on skin that covers bony areas of the body, such as the heels, ankles, hips and tailbone. Current modalities of treatment for bedsore are cleaning, dressing and debridement. According to ITM this problem could be treated if it is discovered early. Hence there is emphasis on the prevention of bedsore with reducing pressure, repositioning and use special

plants in mattress, bed and cushions. When the organs of bedridden patient, becomes red, in order to prevent bed sores formation, Astringent and impediment medicinal herbs such as Rose water, cold Vinegar and some other special plants should be applied topically. Additionally nutritional habit and daily diet should be adjusted clearly in order to create proper circulation in the affected area .When a bedsore is created, proper herbal balm with anti-inflammatory and anti-bacterial effect lotion is recommended.

Conclusion: Treating pressure ulcer as an open wound is difficult. It seems that it will not heal rapidly because of inappropriate circulation or neurological defect. Due to negative impact on quality of life and failure to achieve perfect answer in conventional medicine; it seems that, the recommendations of ITM as a holistic doctrine will be helpful to prevent, control and treat this refractory and potentially fatal disease.

How Curcumin Affect Proliferation, Migration and Collagen Secretion of Skin-Derived Fibroblast Cells

Mohammad Ali Bahar [1], Ali Samadi [2]

1. Burn Search Center, Iran University of Medical Sciences (IUMS), Tehran, Iran
2. Iran University of Medical Sciences (IUMS), Tehran, Iran

Corresponding Author: Mohammadali Bahar, E-mail: mobahar@yahoo.com

ABSTRACT

Background: During dermal wound healing, fibroblasts need to migrate into, and proliferate within the wound site. Accelerated migration of fibroblast across the skin lesion during dermal wound healing profoundly affect the healing processes. The effects of different concentrations of curcuminon on proliferation, migration and collagenesis of fibroblast in relation with wound healing process were explored in vitro.

Material and Methods: The fibroblast cells were exposed to various concentrations of curcumin (1, 3, and 10 µg/ml) and their effects on proliferation, migration and collagenesis of fibroblast were investigated using cell count, scratch assay and total collagen assay.

Results: Among the tested curcumin concentrations, only 1µg/ml curcumin showed a slightly increase in cell proliferation, compared with control. While the remaining curcumin concentrations (3 and 10 µg/ml), had significantly apoptotic effect (P value: 0.243). Compared with the control, there was no significant difference between migration rate of the fibroblast cells and different concentrations of curcumin. In addition, treatment of fibroblast cells with curcumin had no effect on collagen secretion.

Conclusion: This study demonstrated that curcumin had significant influence on decreasing proliferation, migration and collagen secretion rate of fibroblasts.

Is there any Flood - Related Skin Disorders

Masoumeh Rohaninasab

Assistant Professor, Iran University of Medical Sciences (IUMS), Tehran, Iran

Corresponding Author: Masoumeh Rohaninasab, E-mail: masoomehrohani@yahoo.com

ABSTRACT

Flood is defined as an overflow of water expansion from hydrometeorological and geophysical disasters It is one of the most common catastrophes, involving about 40% of the total natural calamities worldwide, causing multiple environmental and healthcare-related consequences, such as direct injuries to humans, animals, and other living beings, contamination of drinking water resources, food, and chemical materials, outbreaks of infectious and water-borne disease, and psychological health disturbances.Inflammatory Skin Diseases, Irritant contact dermatitis begins with the penetration of chemicals or irritants through the permeability barrier, which causes mild damage to keratinocytes and the release of inflammatory mediators. Prolonged submergence in the inundated water is one ofthe risk factors for keratinocytes damage conducing to inflammation and irritation without activation of the immune cascade.Infection , associated factors pertaining to flood-related disaster and infection are specific diseases in endemic areas (e.g. leptospirosis, melioidosis).Fungal skin infection Accordingly, prolonged exposure to flood water increases the risk of superficial fungal skin infection. The foot is the most common area submerged under contaminated water. The presentation of erythematous skin maceration with itching between the interdigital web spaces of the foot is a common finding, also known as the interdigitaltype of tineapedis.Bacterial skin infection, Traumatic wounds are commonly primary skin condition, followed by secondary bacterial infection. Wound infections initially present with increased redness, swelling that rapidly progresses to vesicles, and hemorrhagic bullae. Extensive infections occasionally occur, such as cellulitis, gangrene, necrotizing fasciitis, pyomyositis, and septicemia. Traumatic Skin Diseases, Unsurprisingly, traumatic skin diseases usually occur during and following restoration of working time after disaster,Psycho-emotion Aggravated Primary Skin Diseases Stress can induce psychodermatological diseases due to the effect of psycho-emotional factors that aggravate the primarily underlying diseases, such as atopic dermatitis, urticaria, alopecia areata, angioedema, psoriasis, and vitiligo.65

Effects of Iranian Effective Medicine on Treatment of Grade Two and Three of the Diabetic Foot Ulcers, A Comparative Study with Low level laser Therapy and ANGIPARS

Hassan Hajtalebi [1], Hassan Khani Iurigh [2], Hamid Reza Hajtalebi [3]

1. General Practitioner, North Khorasan University of Medical Sciences, Bojnurd, Iran

2. General Practitioner, Department of Health, Hajtaleb Medical Complex of Alternative and Complementary Medicine, Bojnurd, Iran

3. Pharmacy Student, Student Research Committee, Mashhad University of Medical Sciences, Mashhad, Iran

Corresponding Author: Hassan Hajtalebi, E-mail: dr.h.khani@gmail.com

ABSTRACT

Background: Due to hard-to-treat response, the diabetic foot ulcer is among the common problems in complications of type 2 diabetes. Morbidity and high cost of treating these injuries impose a significant burden on individual and community health system

Material and Methods: In this study, 20 Diabetic Foot Ulcer Patients with Grade 2 and 3 treat base on Iranian Effective Medicine as Integrative medicine. All patients, were age range of 50 – 78 years old and hospitalized with complaint of diabetic foot ulcers, and uncontrolled blood sugar, and sepsis at Emam Reza hospital of Bojnurd in 2013-15. All patients were under the primary treatment of sugar control drugs and infection control. The patients' foot ulcer did not respond to current treatments, and the amputation order was made by Orthopaedist's advice for all patients. The patients referred to traditional medicine clinic for counselling. The patients had sores on different area of right and left foot and almost the severe inflammation were spread over the other fingers and continued to ankle. The wounds had cyanosis and severe infection for at least one to two months. After entering the traditional medicine clinic, the patients were under the control of health and nutrition. Pharmaceutical measures in all patients were according to disease temperament and conditions including the medicinal herbs, combination drugs, and modern blood sugar control drugs. The manual measures were utilized including full back cupping every night until the end of therapy, and leech therapy inside and around the wound with 6 medium to fine-size leeches in 10 sessions once every 3 days.

Results: In all patients, the diabetic foot ulcers healed completely, the patients' physical and mental

states improved, and their blood sugar is controlled after 30-40 days of treatment.

Conclusion: Given the patient's healing process, it seems that combining the modern and Iranian traditional medicine as Iranian Effective Medicine can be cheaper and faster treat most of the Diabetic Foot Ulcer Patients with Grade 2 and 3 in comparison Low level laser therapy and ANGIPARS and it is essential to perform a wide range of assessments and studies in different diseases based on the teachings of medicine.

Keywords: Diabetic Foot Ulcer, Leech Therapy, Traditional Medicine, Modern Medicine, Iranian Effective Medicine

Effects of Medicinal Plants and Traditional Medicine in Wound Healing

Hamed Salehbarmi [1], Mohammad Kazazi, Setareh Tehrani, R.Kazazi, Azadeh Negaresh, S.Sheybani

1. Dermatologist, Assistant Professor, Islamic Azad University Medical Branch of Tehran, Tehran, Iran

Corresponding Author: Setareh Tehrani, E-mail: azadehnegaresh@yahoo.com

ABSTRACT

Wound healing is a biochemical process of restoring normal structure functions of damaged tissue. Wound Healing is a natural function by which body itself overcome the damaged to the tissue but the rate of healing is slow and rate of microbial infection is high. The use of herbal drugs is increasing in developed as well as developing countries because they are safer and well tolerated as compared to those allopathic drugs. In this paper, we examined the effect of herbal medicine in the treatment of wounds. Materials and Methods: study is review article that for it have been used a lot of recent papers about wound healing with medicinal plants from reputable sites instance Google scholar, Pubmed, Scopus and else.

Results: The study investigated the effect of Aloe Vera plant on burn wound. Effect of Aloe Vera in wound healing was significantly. The mechanism of Aloe Vera for wound healing was to be enhancing collages turnover rate and increased level of lysyl oxidase. Gingko biloba plant widely planted in Korea and China. It is has significant activity against both dead space and excision wound models in male rats. The activity of this plant is due to its high amino acid content which absorbs rapidly in blood flow and in combination with vitamins. it is used as an anti-inflammatory and antiallergic agent. Centella asiatica plant grows widely in the wet places. In the Clinical studies used of the formulation ointment, cream and gels of Centella asiatica thrice daily for 21 days on open wound site. The treated wound epithelized faster and the rate of wound contraction was higher as compared to control wound. Gel model has better results as compared to other two formulations. There is reported that the methanolic extract of Hypericum mysorense plant Causes wound healing in rats. The extract, in the form of ointment was evaluated in excision and incision wound models in rat. The effect is comparable with standard drugs.

Conclusion: Plants are more potent healers because they promote the repair mechanism in the natural way.

Keywords: Wound Healing, Plants, Drug, Low Level Laser Therapy

A New Strategy in Preventing Post Burn Hyper-Trophic Scarring

Aziz Ghahary [1]

1. Ph.D. and Director of British Columbia Professional Firefighters' Burn and Wound Healing Research Group, Department of Surgery, University of British Columbia, Vancouver, Canada

Corresponding Author: Aziz Ghahary, E-mail: aziz.ghahary@ubc.ca

ABSTRACT

Wound healing outcome is regulated by a fine balance between deposition and degradation of extracellular matrix (ECM). Over healing formation such as keloid is mediated by exaggerated ECM deposition and abnormalities in ECM degradation. Current treatment modalities for prevention of keloid and hypertrophic scarring have limited efficacy, which raised a great need for innovation within wound care industry. Moving toward novel approaches to prevent these devastating conditions, we identified the anti-scarring properties of Kynurenic acid (KynA), a naturally occurring small molecule generated from tryptophan degradation. To slow down / prevent hypertrophic scar formation, we have delivered KynA within the wounds before and / or during epithelialization by using either topical application of KynA containing cream or KynA slow releasing dressing. The results showed a significant improvement in a fibrotic rabbit ear model received this therapeutic agent.

During the course of this talk, 1) Difficulties associated with post-burn hypertrophic scarring will be presented, 2) The rationale of choosing KynA as a potent anti fibrogenic factor will be discussed, 2) In vitro data on efficacy of KynA as an ECM modulating factor in favor of improving the wound healing outcome will be presented, 3) The benefit of using KynA in a topical cream and slow releasing dressing on a fibrotic rabbit ear model will be shown, finally 3) The safety result of KynA cream in a phase 1 clinical trial will be presented. At the end, the conclusion and the future direction of using KynA as a potent anti-fibrogenic factor for treatment of post-burn hypertrophic scarring will be presented.

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Roles of Advanced Bioactive Wound Dressings in Treating Diabetic Foot Ulcers

Soheila S. Kordestani [1,2], Farzaneh NayebHabib [2], Mitra S. Abyaneh [2]

1. Department of Medical Engineering, Amir Kabir University of Technology, Tehran, Iran
2. Chito Tech Company, Iran

Corresponding Author: Soheila Salahshour Kordestani, E-mail: ss.kordestani@chitotech.com

ABSTRACT

Background: The Aim of this study was to investigate effectiveness of bioactive Wound dressing for treating Diabetic Foot Ulcers (DFU)

Material and Methods: 30 DFUs were selected to receive the bioactive wound dressings (n=30 wounds). Wound healing process was recorded at the beginning of each dressing change. None of 30 Patients dropped out of the study. The rate of wound healing and effectiveness of the dressings were evaluated.

Results: The study demonstrated that the use of advanced bioactive wound dressings increased the rate of healing, reduced the length of hospital stay, eliminated the need for surgical debridement and as a result there were fewer amputations.

Conclusion: The study confirmed the value of advanced bioactive wound dressings. physician's satisfaction and patient`s comfort were significantly increased the healing rate. This will in turn improve the quality of life of these patients and bring significant cost saving for health care system.

Keywords: Diabetic Foot, Wound Healing, Advanced Bioactive Dressing

Functional Analysis of Transcriptional Response During Cutaneous Wound Healing in db/db Mice

Sina Nassiri [1,2], Kambiz Pourrezaei [1], Issa Zakeri [3]

1. School of Biomedical Engineering, Drexel University, Philadelphia, USA
2. Swiss Institute for Experimental Cancer Research, Ecole Polytechnique Federale de Lausanne (EPFL), Lausanne, Switzerland
3. Dornsife School of Public Health, Drexel University, Philadelphia, USA

Corresponding Author: Sina Nassiri, E-mail: sina.nassiri@epfl.ch

ABSTRACT

Wound healing is an extremely intricate and highly dynamic process. High throughput molecular screening technologies such as DNA microarrays hold great potential in enhancing our understanding of complex biological processes, and thus have been extensively exploited in wound healing research. Previous attempts at analyzing transcriptional response during cutaneous wound healing have been limited to conventional statistical methods that are oblivious to the temporal and longitudinal aspects of time-course data. Functional data analysis (FDA) is a branch of statistical methods that treats the entire sequence of time-course data as a single functional entity rather than a set of discrete measurements. By directly utilizing the time structure of data and borrowing information across all time points, FDA can more accurately elucidate transcriptional response during cutaneous wound healing. In this talk, I will present a comprehensive functional approach to analyze time-course microarray data of impaired wound healing in a murine model of diabetes. First, I will demonstrate how functional observations can be constructed from discrete measurements. Second, I will use these functional observations to explore gene expression dynamic from a single-gene perspective. Lastly, I will show how FDA can be utilized to explore the architecture of gene expression and regulatory networks during cutaneous wound healing. Overall, this talk aims to introduce FDA as a novel and extremely powerful statistical analysis framework that may enhance the existing knowledge on transcriptional regulation during pathophysiologic wound healing and lead to identification of novel candidate biomarkers and potential targets with implications in diagnostic and therapeutic applications.

The Value of Medical Leeches in Treatment of Ischemic Finger

Ghasem Raeis Akbary [1], Mohammad Kazazi [2], Hamed Salehbarmi [3]

1. Department of Nursing, Shahid Beheshti University of Medical Sciences (SBMU), Tehran, Iran
2. Resident of Clinical Pharmacy, Tehran University Medical science (TUMS), Tehran, Iran
3. Heart and Vascular Surgeon in Milad Hospital, Tehran, Iran

Corresponding Author: Ghasem Raeis Akbary, E-mail: salehbarmi@gmail.com

ABSTRACT

In the absence of microvascular replantation or in crash injury cases in which obtaining an acceptable function is not possible, amputation of the injured finger seems to be the best treatment modality. Some studies recommended leech therapy for this kind of injury after vascular repair to decrease venous congestion.

Case Presentation: A patient 32 years old was in the ring finger trauma. After a visit to the emergency department of Mahallat city After receiving the X-rays and ischemic wounds of leech therapy was started.

Results: We present two class IIC cases that were treated successfully solely with leeches, with excellent results. Although the method is not a substitute for microvascular intervention leeches can be used when the clinical condition of a patient does not permit a lengthy surgery and if microvascular techniques fail or are thought to be pointless.

Keywords: Leeches Therapy, Ischemic Wound, Medical Leeches

Oral Presentations in Basic Sciences

An Overview of Low Vacuum Applications in the Field of Biology with an Emphasis on Wound Healing

Jalil Badraghi [1], Elaheh Pourfakhraei [1], Saboura Ashkevarian [1], Fatemeh Mamashli [1]

1. Research Institute of Applied Sciences, ACECR, Shahid Beheshti University, Tehran, Iran

Corresponding Author: Jalil Badraghi, E-mail: badraghi@acecr.ac.ir

ABSTRACT

Many of the human societies (about 1%) have some problems about wound. wound healing always is a concern for human and many economic and social costs has imposed in human society. Regardless of the source and cause of wound, principally if other factors such as diabetes and wound infection is higher, it will be difficult healing. Wound healing is often painful and unpleasant for patients. From the 1990s until today, a process called vacuum treatment for treatment of wounds used in lower pressures by doctors and experts all over the world and over time has expanded considerably. Most of the researches were on the effectiveness of the treatment of wounds such as diabetic foot wounds and burns, bed sores, venous and arterial wounds, and radiation wounds. The study also found lower costs in the long-term for society in compare with other new method. Until 1388, the treatment method was not used in Iran. Search in different databases as vacuum therapy and same subject shows the number of papers published in scientific journals on the treatment each year is a significant increase over the previous year. But there are a few articles by Iran's addresses. It can conclude that Iran, despite the development of this method in some countries, not only vacuum therapy isn't using even research on treatment with vacuum is very limit. So, the purpose of this paper is to introduce vacuum therapy and its effect on faster wound healing, useful support can accelerate and reduce pain for patients.

Extremely Low Frequency Magnetic Field Therapy as a Novel Therapeutic Method for Tissue Regeneration and Wound Healing

Alireza Madjid Ansari [1]

1. Department of Biotechnology, Pasteur Institute of Iran, Head of Integrative Oncology Department, BCRC, Tehran, Iran

Corresponding Author: Alireza Madjid Ansari, E-mail: ansari@pasteur.ac.ir

ABSTRACT

There are vast various resources of extremely low frequency magnetic fields in the environment of human beings such as power lines, mobile phones, earth, etc. During the last decade, being exposed to these natural and artificial resources of extremely low frequency (ELF) magnetic fields has become unavoidable for human beings. Owing to concerns due to possible effects of extremely low frequency magnetic fields (ELF-MF) on human health, many studies have been conducted to clarify if ELF-MF can induce alterations in biological processes. ELF-MF could induce the delay of cell cycle progression while it can make changes in squamous cell morphology and increase the rate of filling cellular gaps in culture flask. Also, it has been showed that ELF-MF influences anti oxidative enzyme activities and increases lipid peroxidation. Beyond these cellular and molecular facts, interest in electromagnetic field (EMF) treatments has increased rapidly in recent years due to its advantages over other treatments for tissue healing and infection. Benefits include low-cost, ready availability, ease of localized application, few if any side-effects, and indefinite shelf life. Immunological studies show that low-intensity EMF can interact with cells and tissues, providing a large number of anti-inflammatory and wound healing applications. The effect of EMF on the immune system in phagocytic cells alone has attracted attention because of the role that extremely low-frequency electromagnetic field (ELF-EMF) plays in decreasing the growth rate of bacteria. With today's antibiotic-resistant bacteria, medicine is in need of a mechanism to aid in the control of inflammatory response, greatly benefitting the fields of disease pathology, tissue engineering and regenerative medicine. Pulsed electromagnetic-field stimulation has been investigated as a therapy for wound healing following results that PEMFs can promote healing by potentially increasing collagen synthesis, angiogenesis, and bacteriostasis. Despite these, controversies regarding effects of ELF-MF are still rife.

Stability of Chondroitinase ABC I for Repair Improving of Spinal Cord Injuries

Mina Sadat Naderi [1], Tahere Tohidi Moghadam [2], Khosro Khajeh [2,3], Bijan Ranjbar [1,2]

1. Department of Biophysics, Faculty of Biological Sciences, Tarbiat Modares University, Tehran, Iran
2. Deprtment of Nanobiotechnology, Faculty of Biological Sciences, Tarbiat Modares University, Tehran, Iran
3. Department of Biochemistry, Faculty of Biological Sciences, Tarbiat Modares University, Tehran, Iran

Corresponding Author: Mina sadat Naderi, E-mail: minanaderi@hotmail.com

ABSTRACT

Chondroitinase ABC I (cABC I) is a key and important enzyme for curing spinal cord injuries that cleaves glycosaminoglycan chains. cABC I in damaged nervous tissue facilitates axon regeneration. Stabilization of enzyme could improve its performance. One of the stabilization methods is immobilization of the enzyme on the gold nanorods (GNR), which they are considered as suitable candidates for drug delivery purposes. In this investigation, we studied kinetic stability of immobilized enzyme on gold nanorods. Results indicated of increment of affinity to its substrate, enzyme velocity and storage stability. And so, Immobilization of cABC I on gold nanorods could improve its performance, which could be a new perspective to cure spinal cord injuries.

Keywords: Chondroitinase ABC I, Repairing Spinal Cord Injuries , Enzyme Stability

Biological Study (In Vitro & In Vivo) of Helium Cold Atmospheric Plasma for Wound Healing

Seyed Amir Mirmotalebi Sohi [1], Shiva Irani [1], Abdolkhalegh Deezagi [2], Yousef Seyed Jalili [3], Seyed Mohammad Atyabi [4], Shahriar Mirpoor [3], Mandana Khorami [1]

1. Department of Biology, School of Basic Sciences, Science and Research Branch, Islamic Azad University, Tehran, Iran
2. Department of Biochemistry, National Institute of Genetic Engineering and Biotechnology, Tehran, Iran
3. School of Plasma Physics, Science and Research Branch, Islamic Azad University, Tehran, Iran
4. Department of Pilot Biotechnology, Pasteur Institute of Iran, Tehran, Iran

Corresponding Author: SeyedAmir MirMotalebiSohi, E-mail: armotalebi@srbiau.ac.ir

ABSTRACT

Young fibroblasts can proliferate more than aged cells, and secretion of extracellular matrix (ECM) proteins is lower in the skin of old people. Recently, different low-temperature plasma devices have been developed; however their detailed functions are unclear. We examined the effect of cold atmospheric plasma (CAP) on human and mouse fibroblast cells in vitro and on wound healing in vivo.

Human and mice fibroblasts were treated with helium plasma jet. In vitro studies including: MTT, DAPI and β- galactosidase staining were conducted. In vivo studies were performed on BALB/c. Experimental wounds were treated only every four days for 30s. General and specific staining were applied to evaluate different characteristics including: re-epithelialization thickness, fibroblasts number, inflammatory cells density, granulation tissue and angiogenesis. Real- time PCR was performed on mice wounds samples on 4th, 7th and 15th post-operative days (POD) to assess ECM and cytokine genes expression.

In vitro results showed that CAP increased the proliferation of fibroblasts significantly ($p < 0.05$); however, it did not impact upon senescence in human aged cells. In vivo results confirmed that CAP improved wound healing, and accelerated re-epithelialization in BALB/c. Collagen expression was significantly up-regulated on 4th POD,but TGF-β 2 expression did not change.

CAP had no effect on human cells senescence, but acted as cell division and collagen secretion stimuli, and increased the cell biosynthetic activity which is another aspect of anti-aging in biogerontology.

Keywords: Aging, Low Thermal Plasma, Wound Healing, Fibroblast, Re-epithelialization

Nano Photodynamic Therapy in Wound Healing

Khatereh Khorsandi [1], Reza Hosseinzadeh [1], Maryam Jahanshiri Mogahdam [1]

1. Photodynamic Research Group, Medical Laser Research Center, ACECR, TUMS Branch, Tehran, Iran

Corresponding Author: Khatereh Khorsandi, E-mail: biochem.kh@gmail.com

ABSTRACT

Photodynamic therapy (PDT) is an emerging, non-invasive therapeutic strategy that involves photosensitizer (PS) drugs and external light for the treatment of diseases. The principal medical application during the last century was in cancer therapy but, in these days of rising antibiotic resistance, PDT shows increasing promise as an alternative approach to treating infections (Photodynamic inactivation (PDI)). Despite the great progress in PS-mediated PDT, their clinical applications are still hampered by poor water solubility and tissue/cell specificity of PS drugs. In the last decade, PDT has also been combined with nanotechnology techniques, as the photochemical effectiveness can be greatly enhanced by the use of nanoparticles. Different approaches have been investigated to combine nanoparticles and PDI, for antimicrobial applications. One use of nanoparticles is to improve the binding and uptake of PS by the microbial cells; while another use is to improve the microbial photoinactivation kinetics. Many different kinds of nanoparticles such as titanium nanoparticles, carbon nanomaterials (fullerenes, carbon nanotubes and graphene), liposomes and polymeric nanoparticles have been studied to potentiate antimicrobial PDI. Natural polymers (chitosan and cellulose), gold and silver plasmonic nanoparticles, mesoporous silica, magnetic and upconverting nanoparticles have all been used for PDI. Altogether, the future looks bright for the long and happy marriage of antimicrobial photodynamic inactivation and nanomedicine.

Keywords: Photodynamic Therapy, Wound Healing, Nanoparticles

Noninvasive Optical Technologies for Wound Imaging

Afshan Shirkavand [1,2], Fazel Jahangiri [2], Ezeddin Mohajerani [2]

1. Researcher of Medical Laser Research Center, ACECR, Tehran, Iran
2. Laser and Plasma Institute, Shahid Beheshti University (SBU), Tehran, Iran

Corresponding Author: Afshan Shirkavand, E-mail: afshan_shirkavand@yahoo.com

ABSTRACT

Noninvasive imaging approaches can provide greater information about a wound than visual inspection during the wound healing and treatment process. Here we would like to focus on various noninvasive optical imaging techniques developed to image different wound especially superficial types.

The noninvasive optical imaging techniques include imaging methods including laser Doppler imaging (LDI), optical coherence tomography (OCT), laser speckle imaging (LSI), Terahertz imaging, optical spectroscopy methods like Near-infrared spectroscopy (NIRS), and other complicated ones. The various wounds may image using these techniques include open wounds, chronic wounds, diabetic foot ulcers, and more importantly burns. Preliminary work in the development and implementation of some technologies has demonstrated its potency to differentiate a healing from nonhealing of a wound and assessment depth, dimensions and severity.

A crisis of most of the optical imaging techniques is regarded as limited penetration of light in tissue, few hundred microns to a 1–2 mm from the skin surface, NIRS has the potential to penetrate deeper, demonstrating the potential to image internal wounds.

In addition, by introducing Terahertz nondestructive techniques, using the terahertz domain of electromagnetic radiation (1 THz = 1012 Hz, wavelength: 1 mm to 0.1 mm), based on main interaction of THz waves with water, we are able have accurate monitoring of burns since the burn lesions have different water contents compare to normal tissue.

In summary, most technologies are currently at various stages of translational efforts to the clinic, while NIRS or THz holding a greater promise for physiological assessment of the wounds internal, beyond the gold-standard visual assessment.

Polymerized Nano-Curcumin Attenuates Neurological Symptoms in EAE Model of Multiple Sclerosis Through Down Regulation of Inflammatory and Oxidative Processes and Enhancing Neuroprotection and Myelin Repair

Majid Sadeghizadeh [1], Maryam Mohajeri [1], Mahsa Motavaf [2], Farhood Najafi [2], Mohammad Javan [3]

1. Department of Molecular Genetics, Faculty of Biological Sciences, Tarbiat Modares University, Tehran, Iran

2. Department of Resin and Additives, Institute for Color Science and Technology, Tehran, Iran

3. Department of Physiology, Faculty of Medical Sciences, Tarbiat Modares University, Tehran, Iran

Corresponding Author: Majid Sadeghizadeh, E-mail: sadeghma@modares.ac.ir

ABSTRACT

Multiple Sclerosis (MS) is an inflammatory demyelinating disorder of central nervous system (CNS). Polyphenol curcumin has been used in traditional medicine as an effective drug for a variety of diseases. Different formulations of curcumin are introduced to increase its stability and effectiveness. Here we have examined the effect of polymerized form of Nano-Curcumin (PNC) on experimental autoimmune encephalomyelitis (EAE) as an animal model of MS. EAE was induced in female Lewis rats and PNC or curcumin was daily administrated intraperitonealy from day 12 to 29 post immunization. When the prophylactic effect of PNC was under investigation, rats received PNC from the first day of immunization.

Treatment with PNC resulted in decreased scores of disease in therapeutic and prophylactic administration when compared with control group. Staining by luxol fast blue and H&E and immunostaining of lumbar spinal cord cross sections, confirmed a significant decrease in the amounts of demyelination, inflammation and BBB breaking down. Gene expression studies in lumbar spinal cord showed a corrected balance of pro-inflammatory and anti-inflammatory genes expression, decreased oxidative stress, improved remyelination and increased progenitor cell markers after treatment with PNC. Our results demonstrated an efficient therapeutic effect of PNC as an anti-inflammatory and antioxidative stress agent, with significant effects on the EAE scores and myelin repair mechanisms.

Keywords: Polymerized Nano-Curcumin; Experimental Autoimmune Encephalomyelitis (EAE); Multiple Sclerosis (MS); Oxidative Stress; Myelin Repair.

Promotion of Wound Healing by Alcoholic Extract of Stevia's Bitter Fraction in Experimental Rats

Fariba Najafi [1], Akram Zangeneh [1,2], Nassim Amiri [1,3], Mohammad Mahdi Zangeneh [1,2]

1. Department of Dermatology, Kermanshah University of Medical Science, Kermanshah, Iran
2. Microbiology Section, Pathobiology & Basic Sciences Department, Veterinary Faculty, Razi University, Kermanshah, Iran
3. Microbiology Section, Pathobiology & Basic Sciences Department, Veterinary Faculty, Islamic Azad University, Tehran, Iran

Corresponding Author: Akram Zangeneh, E-mail: akramzangeneh@yahoo.com

ABSTRACT

Background: Ethnomedicinal plants have been identified and prescribed all over human history. Plants make many chemical compounds that are for biological functions, including wound healing, and defence against fungi and bacteria. The medicinal plants are used widely because of their effectiveness, fewer side effects and relatively low cost. Stevia is a medicinally useful plant with many remedial properties. The purpose of this study was determination of healing activity of alcoholic extract of Stevia's bitter fraction (SBF) on wound-healing of skin in rats. To our knowledge, this is the first study on healing properties of the plant.

Material and Methods: A full-thickness cutaneous defect (2×2cm) was induced on the back of 20 rats. The animals were randomly divided into four equal groups, treated with Tetracycline 3% (Group 1), basal cream (Group 2), cream of alcoholic extract of SBF 10% (Group 3) and untreated=control (Group 4). Five animals of each group were euthanized at 30 day post-injury (DPI) and number of total cells and blood vessels (magnification ×200) of skin dermis were counted and evaluated through histopathological analyses.

Results: The number of total cells, blood vessels, fibrocytes, fibroblasts, and ratio fibrocytes/fibroblasts of skin dermis in 30 DPI as follows respectively Group 1: 562.50±36.31b, 9.20±2.20c. Group 2: 902.70±122.30a, 12.20±3.35b. Group 3: 479.70±87.16c, 3.20±1.68d. Group 4: 936.00±64.06a, 13.50±2.73a.

Conclusion: As they are seen number of total cells and blood vessels reduced greatly in Group 3 to Group 1, 2, and 4 in 30 DPI. In conclusion, these results showed that application of alcoholic extract of SBF on wounds induces considerable accelerated wound-healing and it may be offered for treating different types of wounds in human beings.

Keywords: Stevia's Bitter Fraction, Alcoholic Extract, Wound - Healing Activity

Acceleration of Skin Wound Healing: Evaluation of Expression Transforming Growth Factor-ß (TGF- β) Exposed to Inducing Compounds

Nasrin Takzaree [1,3], Abbas Hadjiakhondi [2], Gholamreza Hassanzadeh [3], Alireza Takzaree [3]

1. Mphil & PhD of Biomedical Sciences
2. School of Pharmacy, Tehran University of Medical Sciences (TUMS), Tehran, Iran.
3. School of medicine, Tehran University of Medical Sciences (TUMS), Tehran, Iran.

Corresponding Author: . Nasrin Takzaree, E-mail: takzaree@tums.ac.ir

ABSTRACT

The development of new methods to improve skin wound healing may affect the outcomes of medical conditions. we evaluate the molecular,cellular and clinical effects of Plant compounds on wound healing. Application of natural ingredients and herbs for treating ulcers has been in the history of human life. Nowadays, due to the lack of side effects of medicinal plants and a variety of effective compounds in plants, as well as numerous disadvantages of synthetic drugs there has been tendency to use medicinal plants in clinic. Aloe Vera is a medicinal plant used to treat skin disease. Effects of using Plant compounds e.g. aloe vera gel on the healing process were investigated by microscopic method, cell counting and TGF-ß gene expression in the wound bed. 60 Wistar rats weighing 200 -250 gr were placed under general anesthesia and sterile conditions. Square shape wound with 1.5* 1.5 mm dimension was made on the back of the neck. Rats divided to control and experimental groups and to three subgroups with 4, 7, and 14 days of study. In 1st experimental group Aloevera was used twice on the wound, once in 2nd experimental group and for positive control group phenytoein cream 1% was applied daily from the surgery days; the control group did not receive any treatment. For histological studies, samples were taken from the wound and adjacent skin. This tissue examined for histological staining with H&E and masson's trichrome then wound surface and wound healing were evaluated separately, Also TGF-ß gene expression by estimated by RT-PCR. Results showed that fibroblasts in both groups were significantly increased, caused to acceleration of wound healing. It concluded that twice application of Aloe vera gel will increase TGF-ß gene expression, ultimately accelerate wound healing process.

The macroscopic and microscopic evaluation showed that wound healing increased because the

fibroblast numbers in two experimental groups improved compared with control group. The percentage of wound healing on different days in the experimental and control groups were significant. Data were analyzed by using one-way ANOVA test and $P< 0.05$ was significant.

Present study showed that the twice application of topical Plant compounds e.g. aloe vera mucilage can result in rapid wound healing in rats.

Keywords: Wound Healing, Plant Compound ,Open skin wound, Rat, TGF-ß

Possible Involvement of Nitric Oxide Pathway in Anti - Scratching Activity of Metformin on Chloroquine - Induced Scratching in Mice

Sattar Ostadhadi [1,2], Akram Vesaghati [2], Arash Foroutan [2], Nazgol-Sadat Haddadi [2], Ahmad Reza Dehpour [1,2]

1. Brain and Spinal Cord Injury Research Center, Neurosciences Institute, Tehran University of Medical Sciences, Tehran, Iran.
2. Department of Pharmacology, School of Medicine, Tehran University of Medical Sciences, Tehran, Iran.

Corresponding Author: Sattar Ostadhadi, E-mail: satarostadhadi@gmail.com

ABSTRACT

Chloroquine (CQ), a 4-aminoquinoline drug, has long been used in the treatment and prevention of malaria. However its side effect generalized pruritus contributes to treatment failures, and consequently results in the development of chloroquine resistant strains of Plasmodium falciparum. It was proposed that the administration of CQ correlated with increase in nitric oxide (NO) production. Metformin is among the first-line treatments for management of the type 2 diabetes and avoiding its vascular problems .It was showed that metformin has a modulatory effect on NO production and also in itch .The current study was designed to investigate the effects of intraperitoneal (i.p.) administration of metformin and the association of nitric oxide, in chloroquine (CQ)-induced scratching in mice. Scratching behaviors were recorded by a camera after intradermal (i.d.) injection of CQ (200 and 400 µg/site). CQ was administrated at doses of 200 µg/site and 400 µg/site. Metformin in concentrations of 5 10, 100 and 200 mg/kg, was administered (i.p.) as a single dose, 4 h before the CQ injection .A non-specific nitric oxide synthase (NOS) inhibitor, NG-nitro-L-arginine methyl ester (L-NAME; 1 and 10 mg/kg, i.p); or a nitric oxide precursor, L-arginine (10 and 100 mg/kg, i.p.); administrated 30 min before CQ-injection. Also a neural NOS inhibitor, 7-nitroinidazole (7NI; 1 and 10 nmol/site, i.d.) simultaneously administrated with 400 µg/site of CQ. For evaluation the role of NO in anti-scratching effect of metformin we administrated L-NAME at dose of 1 mg/kg (i.p.) 30 min before CQ injection or 7-NI at dose of 1 nmol/site (i.d.) simultaneously with CQ in metformin-treated (5mg/kg, i.p.) mice. Also l-arginine at dose of (10 mg/kg, i.p.) was administrated 30 min before CQ injection in metformin-treated (200 mg/kg, i.p.).The results obtained show that CQ elicited scratching at dose of 400 µg/site. Metformin (100 and 200 mg/kg, i.p.) reduced the

scratching in a dose-dependent manner. Injection of L-NAME or 7-NI enhanced the anti-scratching effect of metformin significantly. On the other hand, administration of L-arginine as a precursor of NO significantly inhibited this effect of metformin. The results indicate that acute metformin has an anti-scratching effect on CQ-induced scratching in mice. It is concluded that anti-scratching outcome of acute metformin is initiated via inhibition of the NO pathway.

Keywords: Scratching, Chloroquine, Nitric Oxide, Metformin, Mice

Evaluation of in Vivo Wound Healing Activity of Fumaria Vaillantii Total Extract on Different Wound Models in Rats

Fatemeh Davoodi Roodbordeii [1], Minoo Afshar [1], Samira Choopani [2], Fatemeh Haji Abbas Tabrizi [2], Marzieh Dehghan Shahsaltaneh [3], Mona Salimi [2]

1. Department of Pharmaceutics, Faculty of Pharmacy, Pharmaceutical Sciences Branch, Tehran Islamic Azad University (IAUPS), Tehran, Iran
2. Department of Physiology and Pharmacology, Pasteur Institute of Iran, Tehran, Iran
3. Laboratory of Neuro-Organic Chemistry, Institute of Biochemistry and Biophysics (IBB), University of Tehran, Tehran, Iran

Corresponding Author: Mona Salimi, E-mail: salimimona@pasteur.ac.ir

ABSTRACT

Many plant drugs have been used in management and treatment of wound over the years. Fumaria is a member of the Fumariacea family, which used as a wound-healing remedy in Iranian traditional medicine. Previous studies reported the antioxidant as well as anti-inflammatory effects of Fumaria vaillantii extracts. The present study evaluated wound healing potential of gel formulation of Fumaria vallantii total extract using excision and incision wound models in male albino wistar rats. Additionally, histopathological as well as chemical methods such as hydroxyproline determination assay were used in this study. To prepare the total extract, the dried powdered plant was macerated by ethanol: water (80:20) three times at room temperature for 72 h. The obtained total extract was then formulated based on the modified BP method .The parameters including rate of wound contraction, tensile strength, collagenization, epithelialization as well as total collagen determination were then investigated. In each wound model, 20 rats were divided randomly into four groups of 5 rats each; Group 1: topical gel of Fumaria vaillantii total extract (10%) as treated group, Group 2: negative control, Group 3: base gel, Group 4: Alpha ointment as positive control. In the excision model, gel of total extract, base gel and Alpha ointment were topically applied once a day for 21 days and the wound healing rates were calculated on days 2, 4, 6, 8, 10, 12,16,18,21. However in incision model, they were topically applied once a day for 10 days. Our results showed a significant increase in the rate of wound contraction on days 6, 10 and 14. Furthermore, tensile strength increased in the base gel and treated groups compared with negative control. Interestingly, angiogenesis and epithelialization content showed a significant

increase in treated group; however, collagenization and hydroxyproline content revealed no significant change. Our obtained results suggest the gel formulation of F. vaillantii total extract as a good candidate in wound healing, which needs further experiments.

Keywords: Wound Healing, Fumaria Vaillantii, Topical Gel

Biophysical Approaches for Wound Healing

Hoda Keshmiri [1], Gholamreza Esmaeeli Djavid [1], Maryam Jahanshiri [2], Fatemi Seyed Mostafa [2]

1. Medical Laser Research Center, ACECR, Tehran, Iran

Corresponding Author: Hoda Keshmiri, E-mail: hodakeshmiri@yahoo.com

ABSTRACT

Data from the United States indicate that chronic wounds affect around 6.5 million patients with an estimated US$25 billion annual expenditure on their treatment. Wound healing is a complex, dynamic process required for maintaining homeostasis in an organism. Besides many biological and pharmaceutical methods being investigated, there is growing interest in exploring various biophysical technologies (ultrasound, electrical stimulation, phototherapy, and negative pressure wound therapy) believed to be beneficial for managing wound and support healing. Electromagnetic and electrical stimulation appear to modulate the disrupted endogenous electromagnetic fields and aid in reestablishment of trans epithelial potential (TEP). The other three biophysical therapies, namely ultrasound (US), pressure, and light therapies, have been demonstrated to have clinical benefits and their molecular mechanisms appear to involve both biophysical and biochemical perturbations. The scope of this abstract focuses on findings from current literature related to four biophysical technologies believed to be advantageous for wound healing.

Keywords: Wound Healing, Biophysics, Ultrasound, Electrical Stimulation, Phototherapy, Negative Pressure

Autologous Component in Chronic Wound Healing; from Hospital and/or Office to Home

Sadegh Hasannia

Associate Professor in Clinical Biochemistrty, Department of Biochemistry, Faculty of Biological Sciences, Tarbiat Modares University (TMU), Tehran, Iran

Corresponding Author: Sadegh Hasannia, E-mail: drfatemi@gmail.com

ABSTRACT

The human body is capable of impressive acts of self-wound healing. It uses four major components including: 1- Fibrin compact matrix as natural efficient scaffold for expansion of new generating tissue, 2- The platelet as main growth factors source, 3- leukocyte as direct defense cells and promote of efficient inflammation and 4- Albumin and other plasma protein and elements. All of these components exist in L-PRF (leukocyte and platelet rich fibrin), that is obtained from autologous plasma. Simple, cheap and fast preparation in home and office with high quantities of leukocytes and platelets and high concentration of essential growth factors that are trapped in fibrin matrix will be the best selection for acute and chronic wound healing.

Does Low-Level Laser have any Effects on Healing of Temporomandibular Joint Osteoarthritis in Rats?

Ramin Rahati [1], Ali Peimani [2]

1. Student, Rafsanjan University of Medical Sciences, Faculty of Dentistry, Rafsanjan, Iran.
2. Assistant Professor, Department of Oral Surgery, Dental School of Rafsanjan University, Rafsanjan, Iran.

Corresponding Author: Ramin Rahati, E-mail: ramin.rahati@yahoo.com

ABSTRACT

Background: 20-30% 0f adult population have experiences of temporomandibular joint disorder. It seems that referral persistent pain is the most important cause in treatment of 90% of patients. Common therapeutic methods to reduce pain and disfuanction of TMJ are: drugs, occlusal appliences, physical therapy and stress control. studies have shown that using laser can increase the healing process and reduce inflammation. some studies state the advantages of laser therapy on reducing the inflammation of tmporomandibular joint. and doing these experiments are different and most of them lack sufficient information about the physical parameters which are used. The aim of this research is to investigate the low power laser usage in healing of osteoarthritis of rat TMJ.

Material and Methods: The experimental study was conducted on 32 rats. They were divided into 4 groups of two experimental groups and 2 control groups. Number 1 and 3 groups were control, and number 2 and 4 were experimental groups. After general anaesthesizing, chronic experimental inflammation was induced by injection of Compelet Freunds Adjvant (CFA) into TMJ of all 4 groups. One day after, The right TMJ joint of number two experimental group after general anaesthesizing, were treated with Helium- Neon Laser for 3 days. And right TMJ of number 4 experimental group was treated with Helium- Neon Laser for 7 days. On the third day of the inflammatory and proliferation phase, number 1 and 2 groups, and on the seventh day of the restructuring phase and time of closing wound, number 2 and 4 groups were sacrificed and They were surveyed by pathologist. Results of statistical Fisher's exact test was analyzed.

Results: The 3 days laser therapy, there was no significance difference in angiogenesis, quantity grade of cartilage, the number of cell layer, the number of inflammatory cells, and arthritis. But 7 days after the laser therapy, arthritis, the number of inflammatory cells, inflammatory of cartilage was reduced. and the number of cell layer, quantity grade of cartilage and angiogenesis was

significantly increased. (p<0/05)

Conclusion: Using helium – Neon power output 100 (mw) laser significantly can reduce Osteoarthritis of rat TMJ.

Keywords: Low Level Laser, Temporomandibular Joint, Osteoarthritis, Rat

Does Heavy Hse of Mobile Phone Decelerate the Wound Healing?

Najmeh Jooyan [1], Bahram Goliaei [1], Seyed Mohammad Javad Mortazavi [1]

1. Institute of Biochemistry and Biophysics, University of Tehran, Tehran, Iran

2. Ionizing and Non-ionizing Radiation Protection Research Center (INIRPRC), Department of Medical Physics & Medical Engineering, Shiraz University of Medical Sciences (SUMS), School of Medicine, Shiraz, Iran

Corresponding Author: Najmeh Jooyan, E-mail: n.jooyan@ibb.ut.ac.ir

ABSTRACT

Background: Injured tissue is repaired in the process of wound healing. Without any progressive treatments, it lasts a long time to completely heal and in some patients wounds do not respond to the standard therapy. Some stress can modulate this process. Remarkable growth in cell phone usage and related technologies put us in an ocean of radiofrequency radiation. So In this work we studied radiofrequency radiation as an environmental factor which can affect the wound healing process focusing on the proliferation phase which is one of the most important stages of wound healing.

Material and Methods: Chinese Hamster Ovary cells were incubated in a waveguide modified to support the GSM mobile radiation and were exposed to RF of 900 MHz and 2 W created by simulator for different times. Afterwards, colony formation and viability tests were carried out to assess the change in the cell proliferation ability.

Results: The results showed that exposure to radiofrequency radiation for 12 and 24 hours reduced the surviving fraction of cells as compared to sham exposed ($P = 0.08$) but not in a dose-dependent manner. However, no change was observed in cell viability after 24, 48 and 72 hours post RF exposure.

Conclusion: It appears that mobile phones have negative effects on wound healing and should not be used by patients with chronic ulcerations.

Keywords: Radiofrequency Radiation, Proliferation, Wound Healing

Ethnomedicinal Plants: Wound-Healing Potential Following Cream of Punica Granatum's Aqueous Extract Application in Experimental Rats

Fariba Najafi [1], Nassim Amiri [1,2], Akram Zangeneh [1,2], Mohammad Mahdi Zangeneh [1,2], Hossein Amiri [1,3]

1. Department of Dermatology, Kermanshah University of Medical Science, Kermanshah, Iran
2. Microbiology Section, Department of Pathobiology & Basic Sciences, Veterinary Faculty, Razi University, Kermanshah, Iran
3. Department of Clinical Sciences, Veterinary Faculty, Islamic Azad University, Kurdistan, Iran

Corresponding Author: Mohammad Mahdi Zangeneh, E-mail: m.mahdizangeneh@gmail.com

ABSTRACT

Background: Healing is a normal phenomenon by which body itself dominate the damaged to the tissue but the rate of healing is very gradual and chance of microbial infection is vast. Recovery in healing procedure can be perform either shorten the time required for healing or to minimize the undesired consequences. The medicinal plants are used widely because of their effectiveness, fewer side effects and relatively low cost. Punica granatum is a medicinally useful plant with many remedial properties. The purpose of this study was determination of healing activity of aqueous extract of P. granatum on wound-healing of skin in rats. To our knowledge, this is the first study on healing properties of the plant.

Material and Methods: A full-thickness cutaneous defect (2×2cm) was induced on the back of 20 rats. The animals were randomly divided into four equal groups, treated with Tetracycline 3% (Group 1), basal cream (Group 2), cream of aqueous extract of P. granatum 10% (Group 3) and untreated=control (Group 4). Five animals of each group were euthanized at 10 day post-injury (DPI) and number of lymphocytes, macrophages, fibrocytes, fibroblasts, and ratio fibrocytes/fibroblasts (magnification ×200) of skin dermis were counted and evaluated through histopathological analyses.

Results: The number of lymphocytes, macrophages, fibrocytes, fibroblasts, and ratio fibrocytes/fibroblasts of skin dermis in 10 DPI as follows respectively: Group 1: 7.30±3.30a, 1.60±1.26b, 2.70±1.56b, 21.10±3.66c, 0.12±0.07a. Group 2: 1.00±1.15c, 0.30±0.67c, 1.20±1.61c, 49.70±9.32b, 0.01±0.03d. Group 3: 0.30±0.94d, 0.00±0.00d, 6.30±2.00a, 66.40±15.17a, 0.10±0.06b. Group 4:

3.50±2.17b, 2.20±1.81a, 1.90±1.59bc, 27.70±6.12c, 0.06±0.05c.

Conclusion: As they are seen number of lymphocytes and macrophages reduced and number of fibrocytes and fibroblasts increased greatly in Group 3 to Group 1, 2, and 4 in 10 DPI. In conclusion, in the present study we demonstrate that aqueous extract of P. granatum is efficient in wound healing and that it cures conditions at the wound site to elevate better healing.

Keywords: Punica Granatum, Aqueous Extract, Wound-Healing Activity

Physical and Antimicrobial Properties of Starch-Based Film Containing Ethanolic Propolis Extract for Biomedical Applications

Asghar Eskandarinia [1], Mohammad Rafienia [1], Sepehr Navid [2]

1. Department of Biomaterials and Tissue Engineering, School of Advanced Technologies in Medicine, Isfahan University of Medical Sciences, Isfahan, Iran

2. Department of Microbiology, School of Medicine, Isfahan University of Medical Sciences, Isfahan, Iran

Corresponding Author: Asghar Eskandarinia, E-mail: a.eskandarinia1@gmail.com

ABSTRACT

Propolis is a natural product that meets the requirements as functional additive for wound dressing due to its antimicrobial activities. In this work, ethanolic propolis extract (EPE) loaded corn starch (EPE/CS) were successfully prepared using casting of EPE/CS blend solution, and characterizations with respect to their mechanical properties, contact angle (CA), Attenuated total Reflectance-Fourier Transform Infrared (ATR-FTIR) Spectroscopy as well as antimicrobial capacities were performed.

The results showed that tensile strength was not affected ($P > 0.05$) by the presence of EPE but Young's modulus decreased about 30% when compared to control films possibly because of EPE plasticizer effect. When 1% EPE was used, changes in contact angle (CA) properties were detected by a slightly hydrophobic character at films CA. The antibacterial activity of composite corn starch film is increased with increasing amount of propolis. The films exhibited antimicrobial activity against Staphylococcus aureus and Escherichia coli even at low EPE concentrations (1%) mainly due to its phenolic compounds. Therefore, with the antimicrobial activity, ethanolic propolis extract loaded corn starch film will be a potential candidate for wound dressing and skin tissue engineering.

Keywords: Starch, Propolis, Physical Properties, Antimicrobial

An Ideal Skin Substitute for Wound Regeneration

Hojjat Naderi-Meshkin [1]

1. Stem Cells and Regenerative Medicine Research Group, Academic Center for Education, Culture and Research (ACECR), Khorasan Razavi Branch, Mashhad, Iran.

Corresponding Author: Hojjat Naderi-Meshkin, E-mail: nahojjat@gmail.com

ABSTRACT

Ageing, obesity and diabetes closely correlated with the increase of various kinds of wounds. In spite of progress in wound management, still many patients suffer from wounds fail to heal or their ulcers relapse. This cause organ amputations, morbidity and mortality of many patients worldwide. In addition, wounds impose enormous and rapidly growing costs for health care systems, besides psycho-social burden and the individual distress.Therefore; treatment methods that are medically effective, safe and inexpensive are desperately needed. Tissue engineering by employing a source of cells/stem cells and a biomaterial on which the cells can grow, proliferate, and differentiate as well as exploiting growth factors take part in developing engineered tissues/organs. Tissue engineered organs can compensate the scarcity of donor organs. However, despite significant advances have been made particularly in skin tissue engineering, the field so far has failed to fulfil the expectations and is still need further development. Generally, current trend of wound care has shifted from solely achieving satisfactory survival rate to improvement in function and quality of healed wound (for example, being scar- free). The change in the trend has demanded for ideal skin substitutes and the emergence of various skin substitutes in the management of skin injury such as the acutely burned patients as well as diabetic foot ulcers. Conventionally, autologous split or full-thickness skin graft have been recognized as the gold standard of burn wound treatment, however, it is constrained by the low availability of donor source, especially in vast and severe burns. Moreover, autograft application creates additional wounds and scarring at the donor site. Thus, bioengineered skin substitutes (BSS) might represent artificial, off-the-shelf alternatives to the skin grafts with the benefits of less pain, less risk of cross-infection, less/no need for graft harvesting and etc.

Keywords: Bioengineered Skin Substitutes (BSS), Wound Healing, Stem Cells, Regenerative Medicine, Innovative Approaches

Keratinocyte-like Cells (KLCs): New Drug for Old Wounds

Muhammad Irfan-Maqsood [1,2,3], Hojjat Naderi-meshkin [2], Maryam M. Matin [1], Ahmad Reza Bahrami1 [1]

1. Department of Biology, Faculty of Sciences, Ferdowsi University, Mashhad, Iran
2. Stem Cell and Regenerative Medicine Research Group, ACECR-Khorasan Razavi Branch, Mashhad, Iran
3. Department of Regenerative Medicine, Jinnah Institute of Gene and Cell Therapy, Pakistan

Corresponding Author: Muhammad Irfan-Maqsood, E-mail: muhammadirfanmaqsood@gmail.com

ABSTRACT

Non-healing cutaneous wounds are the rising health threat and economic issue for society and patient's family as there are 7 million victims of chronic wounds creating an economic burden of >50 billion USD per year only in USA and approximately 37 million skin wounds globally. From the first successful skin graft by Reverdin in 1871, a variety of biological and synthetic skin substitutes have been developed but precise healing is still a dream by researchers. Cell based therapies have raised a hope in regenerative medicine in last decade and due to the limitations in keratinocyte grafting, stem cells especially mesenchyaml stem cells (MSCs) have been proposed as promising candidates for cutaneous wound healing but their non-specific lineage differentiation and escape of cells from site of transplantation have made it critical for being applied in clinics. Keratinocytes-like cells (KLCs), generated by inducing MSCs could be a live drug for precise healing. In this work, we generated KLCs in vitro and found that these cells are very similar to human keratinocytes (hKCs), morphologically, physiologically and genetically (expression of cytokeratin 5, 10, 14, 18, 19, INV, P63). These cells also showed similarity in the expression of cell surface markers (α6-integrin, CD71) and intracellular protein expression (involucrin, P63) with keratinocytes when subject to flow cytometry and western blottin. These cells were found potent enough to develope stratified epidermis like tissue (histological analysis) and were found prolfierative (PDT) which will help to maintain the hetergenous cellular populatio. Pre-clinical and clinical studies are required to confirm regenerative capabilities of KLCs.

Keywords: Keratinocytes, Mesenchymal Stem Cells, Keratinocyte-like Cells, Cutaneous Wound Healing, Stratified Epidermis

Evaluation of Antimicrobial Efficacy of Colloidal Silver and Effects of Colloidal Silver in Wound Re-Epithelialization

Shiva Dehghan

Medical Student of Isfahan University of Medical Sciences, Isfahan, Iran

Corresponding Author: Shiva Dehghan, E-mail: Shiva2010med@yahoo.com

ABSTRACT

Silver has a long and intriguing history as an antibiotic in human health care; it was a common topical antiseptic in the early 20th century and later mostly was ignored in favor of more effective antibiotics. It has been an effective agent with known efficacy on bacterial, viral, and fungal infections, and also clinical approach showed that it can be a good choice to promote re-epithelialization of superficial cutaneous ulcers of different origins as well as control of infections.

Silver particles have physic-chemical and biological effect on wound that enhances healing of a wound. Biologically, active silver ions bind and act over various bacterial cells structures and execute its potential effects by various mechanisms. The bacterial resistance to silver preparations is slower and less as compared to antibiotics.

The antibacterial activities of silver nanoparticles are strongly dependent on their sizes and shapes. The particle size of silver used in the preparation has been found to be a good predictor of their antibacterial activity.

Currently there are different methods for producing silver particles and many silver-based preparations are presented for management of wounds. Silver-based products can be used in both chronic and fresh wound.

In this article, we discuss antimicrobial and wound re-epithelialization efficacy of colloidal silver used as spray.

Comparative Effects of Silver Sulfadiazin Ointment and Stimulated Mesenchymal Stem Cell with LPS and Poly-I-c on Burn Healing

Leyla Soleymani [1], Rahim Hobbenaghi [2], Samad Zare [1], Nowruz Delirezh [3], Kiavash Hushmandi [4]

1. Department of Biology, Faculty of Science, Urmia University, Urmia, Iran
2. Department of Pathobiology, Faculty of Veterinary Medicine, Urmia University, Urmia, Iran.
3. Department of Microbiology, Faculty of Veterinary Medicine, Urmia University, Urmia, Iran
4. Department of Veterinary Science, Shahid Chamran University, Ahvaze, Iran.

Corresponding Author: Leyla Soleymani, E-mail: lsoleimany@yahoo.com

ABSTRACT

Background: Burns injuries, specially sever ones, have an adverse effect on people`s personal and social life. increasing evidence demonstrate that Bone marrow mesenchymal stem cells are useful for accelerate burn healing . In these study effects of stimulated Bone marrow mesenchymal stem cells with LPS and Poly-I-C were assessed on burn healing and compared with control group.

Mateial and Methods: In an experimental study that was performed in Urmia University, The thired-degree skin burn was induced on the shaved back of healthy 7-8 week old with a metal rods heated in boiling water. Bone marrow mesenchymal stem cells were separated and stimulated with LPS (10ngr/lit) and Poly-I-C (5µg/lit) at the same time for 1 hour. base on equal physical condition, mic were divided into 2 separate groups and the subcutaneously admininistred with phosphate buffer salin and applied daily Silver sulfadiazine ointment in control group and stimulated Bone marrow mesenchymal stem cells with LPS and Poly-I-C (106 cell in 400 µl) In treatment group. 7, 14 and 21 days after induction of burn injury, biopsies were taken from burn wound and then the section were prepared. Subsequently the prepared section were stained with hematoxylin eosin and masons trichrome to explore histopathological change avoke by administration of stimulated Bone marrow mesenchymal stem cells with LPS and Poly-I-C incomparision with control subject.

Results: The study of wound healing parameters including formation of granulation tissue (Respectively on day 21 $p \leq .005$), angiogenesis (on day 21 $p \leq .002$) and collagen deposition demonstrate treat with stimulated Bone marrow mesenchymal stem cells with LPS and Poly-I-C accelerate the rate of healing

Conclusion: our study suggest that subcutaneously injection of stimulated Bone marrow mesenchymal stem cells with LPS and Poly-I-C in burn area has positive effect on healing of burn wound through stimulation of granulation tissue, angiogenesis, fibroblast proliferation and collagen deposition.

A New Approach for Optimization of Keratinocyte Culture and Fabrication of Keratinocyte Epidermal Sheets without Using 3T3 Feeder Layer

Halimeh Hassanzadeh [1,2], Maryam M. Matin [1,2,3], Hojjat Naderi-Meshkin [1], Mahdi Mirahmadi [1], Hamid Reza Bidkhori [1], Mahmood Raeesolmohaddeseen [1], Nasser Sanjar Moussavi [4], Ahmad Reza Bahrami [2,3]

1. Stem Cell and Regenerative Medicine Research Group, Iranian Academic Center for Education, Culture and Research (ACECR), Khorasan Razavi Branch, Mashhad, Iran

2. Department of Biology, Faculty of Science, Ferdowsi University, Mashhad, Iran

3. Cell and Molecular Biotechnology Research Group, Institute of Biotechnology, Ferdowsi University, Mashhad, Iran

4. Department of General Surgery, Islamic Azad University, Mashhad Branch, Mashhad, Iran

Corresponding Author: Maryam M. Matin, E-mail: nahojjat@gmail.com

ABSTRACT

The rise in the incidence of obesity and diabetes has increased the burden of treating chronic wounds. Burn injuries also affect 11 million people worldwide annually. In addition, postsurgical wound cares are not cost effective for healthcare system. Although conventional split-thickness autologous skin grafts (STSGs) are still the gold standard of care for burn treatment, finding an alternative approach is essential due to the disadvantages of skin autografts such as limited healthy donor sites in extensive burns and donor-site morbidity.

Cell therapy can be applied for treatment of various types of skin defects as well as both acute and chronic wounds without major surgical procedures. Following the successful cultivation of keratinocytes by Rheinwald and Green in 1975, these cultured cells were used for treatment of a burn patient for the first time. Keratinocytes consist approximately 90-95% of epidermal cells forming basal, spinous, granular, and cornified layers that correspond to progressive stages of differentiation. In treatment of both chronic and acute wound, reduction of inflammation, induction of cell proliferation and migration, development of angiogenesis and releasing paracrine signaling molecules are some cellular functions accelerating wound healing which are controlled by mesenchymal stem cells. Considering the impacts of MSCs on wound healing, the main aim of this study was the establishment of a novel approach to culture isolated keratinocytes in vitro to generate epidermal keratinocyte sheets without using feeder layer. In

this study the expression of differential (K10, invulocrin, filaggrin) and stem cell (K19, K14, P63 and α6β1 integrin) markers in keratinocytes cultured with a modified medium were examined using flow cytometry and real time PCR on days 7, 14 and 21 and the results were compared with control group (cells cultured with EpiLife medium). The results indicated that this medium may be a good alternative for keratinocyte culture and producing epidermal sheets for therapeutic and clinical purposes.

Keywords: Keratinocyte Culture, Epidermal Sheet, MSC, Wound Healing

Electrospun Nanofiberous Scaffolds Based on Gelatin and Chitosan–ß-Glycerol Phosphate with Suitable Mechanical and Biological Properties for Tissue Engineering and Wound Healing

Marzieh Lotfi, Hojjat Naderi-Meshkin, Roohollah Bagherzadeh, Asghar Mafinezhad, Majid Ghayaour-Mobarhan, Hamid Reza Bidkhori

Corresponding Author: Marzieh Lotfi, E-mail: nahojjat@gmail.com

ABSTRACT

Nano fiberous scaffold is considered as a promising approach in the regenerative medicine. Graft instability of collagen, by causing poor mechanical properties and rapid degradation, and their hard handling remains major challenges to be addressed.

In this research, a composite structured nanofibrous scaffold, made from a mixture of chitosan–ß-glycerol phosphate–gelatin (chitosan–GP–gelatin were prepared at ratios of 30/70, 50/50, 70/30 (w/w) and their mechanical and biological properties were evaluated. The nanofiber scaffold was implanted into the prepared wounds on the dorsum of the rats. The percentage of wound closure was compared with control by Image J. Hematoxilen-Eosin (H&E) staining was performed to investigate the healing effects of the Chitosan-ß-glycerol phosphate–gelatin nanofiber scaffold.

The results show that significantly faster wound closure was found for Gelatin -Chitosan- GP nanofiber compared with the control.

The rate of re-epithelialization and shortening of the linear epithelial gaps and The angiogenesis in scaffold group was significantly more (almost one and a half times) than controls

Thickness of granulation tissue (GT) in the control groups after 14 days is equal to the thickness of granulation tissue in the scaffold of 7 days and the GT in the scaffold was significantly denser compared to the controls after 7 days. A high degree of acute inflammation was observed in the wounds covered with scaffold of 7 days, whereas controls were affected by chronic inflammation.

In conclusion, the data clearly showed that chitosan–ß-glycerol phosphate–gelatin nanofiber scaffold

significantly improved wound healing in a rat model. This approach may be an effective strategy in the treatment of burns, bedsores and diabetic ulcers.

Keywords: Scaffold, Nanofiber, Electrospining, Chitosan, Gelatin, Wound healing.

Successful Experiences in Maggot Debridement Therapy on Patients with Diabetic Foot Ulcers and Kidney Disorders

Azam Malekian [1,2], GholamReza Esmaeili Djavid [2], Kamran Akbarzadeh [1], Siamak Bashardoust Tajali [2,3], MehrAngiz Totonchi [2], Amir Reza Farhoud [2,3]

1. School of Public Health, Tehran University of Medical Sciences
2. Medical Laser Research Center, Academic Center for Education, Culture and Research, Tehran University of Medical Sciences Branch
3. Tehran University of Medical Sciences

Corresponding Author: Azam Malekian, E-mail: azammalekiean@yahoo.com

ABSTRACT

Background: Maggot Debridement Therapy (MDT) is introduced as one of the best treatment option for various kinds of chronic wounds. The patients with chronic wounds may suffer many side complications such as kidney disorder. The complicated disorders of patients with diabetic mellitus may lead to fail the treatment approaches. The aim of this survey was to study effectiveness of MDT on patients with diabetic mellitus who suffer such complicated disorders.

Material and Methods: We experienced MDT on five patients with diabetic foot ulcers who suffered kidney disorder as well. The patients were recruited from multidisciplinary wound clinic in ACECR – Tehran University of Medical Sciences branch. The age range was between 30-80 years old with at least ten year experience of diabetes. All patients had been informed about ethical terms and conditions of the study and signed consent form before enter to the study. Sterile larvae of Lucilia Sericata, which were reared in a laboratory at Tehran University of Medical Sciences, were applied on wound surface by an experienced practitioner. The MDT and appropriate dressing were repeated three to seven times based on the wound surface screening.

Results: Four patients were treated successfully, while the other one did not show any improvement due to failing of granulation tissues. Modern Maggot Therapy may leads to improve wound healing process in diabetic foot ulcers who suffers kidney problems. There are controversies on combination of the MDT method with standard care for diabetic foot ulcers with kidney disorders. But, no side effects

were reported following these patients in two months. Some researchers suggested using the MDT before hemodialysis for the patients with diabetic foot ulcers who suffered kidney disorders.

Conclusion: The MDT may help to improve healing process in patients with diabetic foot ulcers who suffer kidney disorder. More randomized controlled trials are necessary to provide better clarification of this concept.

Biofilms in Wounds and Antibiofilm Strategies

Ahya Abdi-Ali [1]

1. Associate Professor of Microbiology, Department of Microbiology, Faculty of Biological Sciences, Alzahra University

Corresponding Author: Ahya Abdi-Ali, E-mail: abdialya@alzahra.ac.ir

ABSTRACT

The role played by bacterial biofilm in chronic wounds has been emphasized, as a major detriment to wound healing in recent years. Biofilms are structured communities of bacterial or fungal cells enclosed in a self-produced polymeric matrix that adheres to both inert and living surfaces. They provide a protective shield for bacteria to thrive and resist damage from many extreme environmental conditions.

Biofilm-encased microbes are almost universally resistant to disinfectants and other chemical treatments, including antibiotics, up to a 1,000-fold increase in resistance compared to planktonic bacteria and can result in prolonged infection and patient suffering as well as increased mortality and health care costs.

Today, new approaches are being designed to prevent or break up biofilms and hence make microbes more susceptible to antimicrobials for clearance by the host immune system.

In this review, antibiofilm strategies to inhibit or disrupt biofilms are discussed.

Evaluate Antimicrobial Effect of Lactobacillus Gasseri on Pseudomonas Aeruginosa Isolated from Clinical Samples of Burn Patients

Mahsa Zolfaghari [1]

1. Department of Microbiology, Pharmaceutical Sciences Branch, Islamic Azad University, Tehran, Iran

Corresponding Author: Mahsa Zolfaghari, E-mail: mahsazolfaghari85@yahoo.com

ABSTRACT

Background: Pseudomonas aeruginosa is widely distributed in nature and is considered as an opportunist pathogen for human. Increase in anti-biotic resistance and the emergence of treatment resistant strains is one of the most important challenges in treatment of Pseudomonas aeruginosa infections in burn patients. This study aims to evaluate the antimicrobial effect of Lactobacillus gasseri on Pseudomonas aeruginosa isolated from clinical samples of burn patients.

Material and Methods: Samples were collected from burn patients in Motahari hospital/Tehran during 6 months. The isolated strains were identified using differentiation and biochemical tests . Fifty strains of Pseudomonas aeruginosa were isolated from a total of 78 samples (64.10%). In order to determine the resistance of these strains, antibiotic susceptibility test was performed using Kirby-Bauer disk diffusion method according to CLSI standard. The antimicrobial effect of Lactobacillus gasseri was evaluated by agar well and disk diffusion methods.

Result: Most strains showed high resistance to the common antibiotics but showed considerable sensitivity to the supernatant of Lactobacillus gasseri. The mean growth inhibition zone of Lactobacillus gasseri is more than colistin and from statistic point of view this deference is meaningful ($p<0.05$) .This study showed that the use of Lactobacillus gasseri has significant inhibitory effect on multi drug resistant strains of Pseudomonas aeruginosa.

Conclution: These results indicate that Lactobacillus gasseri and/or its by-products are potential therapeutic agents for the local treatment of Pseudomonas aeruginosa burn infections.

Keywords: Pseudomonas Aeruginosa, Multidrug Resistant, Lactobacillus Gasseri, Antimicrobial Effect

Improving Efficacy of Photodynamic Therapy for Bacterial Biofilms Using Different Nanosystems

Smaeil Darabpour [1], Nasim Kashef [1], Mohammad Mahdi Doroodmand [2], Sharmin Kharrazi [3]

1. Department of Microbiology, School of Biology, College of Science, University of Tehran, Tehran, Iran

2. Department of Chemistry, College of Science, Shiraz University, Shiraz, Iran

3. Department of Medical Nanotechnology, School of Advanced Technologies in Medicine, Tehran University of Medical Sciences, Tehran, Iran

Corresponding Author: Smaeil Darabpour E-mail: ismal_dar@yahoo.com

ABSTRACT

Biofilms are involved in approximately 80% of human infections. The efficiency of photodynamic therapy (PDT) as a new technique to treat biofilms can be enhanced by various nanotechnology platforms.

Here we aimed to improve the efficacy of PDT for bacterial biofilms using different nanosystems (nano-photosensitizers).

The photosensitizer systems were synthesized and characterized by several techniques. At first, in vitro phototoxic effect of the nano-photosensitizers on 24 h-old biofilms of Staphylococcus aureus and Pseudomonas aeruginosa was studied. Also, in vitro cytotoxicity and phototoxicity of these photosensitizer systems (under the same experimental conditions as used for the antibiofilm photodynamic therapy) was assessed on human dermal fibroblasts. In the next step, in vitro phototoxic effect of the best photosensitizer system (considering efficiency and safety) on biofilms of different ages (24, 48, 72 and 96 h) was studied. Finally, to determine the effect of the two best photosensitizers-PDT on P. aeruginosa biofilm structure, three-dimensional (3D) morphology and surface of biofilm was investigated by atomic force microscopy (AFM).

PDT mediated by methylene blue-based photosensitizer systems including methylene blue+chitosan nanoparticle (mixed), methylene blue-chitosan nanoparticle (encapsulated), methylene blue-gold nanoparticle (conjugated) and methylene blue-graphene oxide quantum dot (conjugated) resulted in increased antibiofilm efficiency than MB-mediated PDT alone. Also, the studied nanoparticle-based photosensitizer systems including g-C3N4 nanoparticle and Ag/SiO2 co-doped fullerene showed significant antibiofilm PDT. At the same experimental conditions, <30% of the fibroblasts were photoinactivated. Methylene blue-conjugated gold nanoparticles (as the best photosensitizer system)

exhibited significant antibiofilm PDT efficacy against mature biofilms.

An analysis of the AFM topography 3D-images showed that PDT mediated by Ag/SiO2 co-doped fullerene and methylene blue-graphene oxide quantum dot induced severe morphological and surface alterations (loss of the typical cell morphology and increase in surface roughness, respectively) of P. aeruginosa biofilm.

The present findings showed that nanoparticles can enhance the efficacy of antibiofilm PDT through various processes (such as drug delivery, surface plasmone resonance effect, fluorescence quenching and antimicrobial/antibiofilm activity).

PDT mediated by methylene blue-conjugated gold nanoparticles, Ag/SiO2 co-doped fullerene or methylene blue-graphene oxide quantum dot offer a new modality for fast and efficient destruction of biofilms, suggesting their potential use in chronic wound healing.

Keywords: Photodynamic Therapy, Nanotechnology, Biofilm, Wound

Hydrogel Wound Dressing with Effective Drug Release to the Wound Site

Mahmood Ghafghazi [1], Mojtaba Koosha [2]

1. Department of Polymer Engineering and Color Technology, Amirkabir University of Technology (Tehran Polytechnic), Tehran, Iran
2. Department of Pulp and Paper Technology, New Technologies Engineering Faculty, Zirab Campus, Shahid Beheshti University, Mazandaran, Iran

Corresponding Author: Mojtaba Koosha, E-mail: m_koosha@sbu.ac.ir

ABSTRACT

The skin is the largest organ in the body which protects other organs from injury. Wound is any damage to the skin that can be very dangerous due to the attack of microorganisms which may result in severe infection and death. According to the healing period, wounds are classified into acute and chronic. Chronic wounds require more than 12 weeks for healing and may infect, reoccur or not heal at all. Chronic wounds may result from systemic infection, vascular or immune insufficiency or metabolic disorders. Many patients suffer from chronic wounds such as diabetic foot ulcers. Wound dressings are used to prevent wound from infection, absorb wound exudates, release therapeutic agent to the wound site and accelerate wound healing. Hydrogels are cross-linked hydrophilic polymers which are used as wound dressing materials. Hydrogel wound dressings are an important product in the wound care market around the world. They provide a moist environment which promotes wound healing. Also, they have the potential to incorporate and release drugs in the wound site. In the present work, a hydrogel wound dressing containing herbal extract was fabricated and characterized by FTIR spectroscopy, tensile strength and swelling test. Release of the extract from the wound dressing was also studied by a UV-VIS spectrophotometer. Biocompatibility of the dressing was also verified by cell culture experiments. Finally, the hydrogel wound dressing was tested in a clinical study for the healing of diabetic foot ulcers. Results of this study shows that most of the patients with diabetic fool ulcer, can be healed using our drug-releasing hydrogel wound dressing.

Keywords: Hydrogels, Drug Delivery, Wound Healing, Wound Dressing

Effects of Topical Application of Lactobacillus Acidophilus on Second Degree Burn Wounds in Male Rats

Masoud Hashemzaei [1], Amir Abbas Barzegari, Raheleh Majdani, Alireza Alihemmati

1. Department of Microbial Biotechnology, University of Maragheh, Maragheh, Iran

Corresponding Author: Masoud Hashemzaei, E-mail: masoud.hashemzahi@gmail.com

ABSTRACT

Nowadays, there is a growing tendency for the use of natural products in treatments of burn injuries, as people consider them more safe. Probiotics are living micro-organisms that may have benefits on human health. Previous studies showed that, Lactic acid bacteria, as a group of probiotics, may have beneficial effects on the skin health. Moreover, the benefits of topical use of some strains of probiotic bacteria on the wound healing have been shown in previous researches. Because, the effects of probiotics is strictly strain dependent, in the current study, the effects of Lactobacillus acidophilus on the second degree burn wounds was studied in the rats.

Material and methods: In this study the male wistar rats that were housed in a standard animal room were used. Second degree burn wounds were induced by putting aluminum bars with the temperature of near 99 °C on the dorsum of rats for 15 seconds. The rats randomly divided into groups of five. Negative control groups received no treatments. Positive control groups received ocerin as vehicle of bacteria and experimental groups received bacteria in ocerin. Then the process of healing of wounds were evaluated by measuring the wound area in the 3,7,14 days after induction of wounds.

Results: Evaluation of wound area after treatments of burn wounds with the probiotic bacteria, Lactobacillus acidophilus, showed that the speed of healing process of wounds in the experimental groups were significantly faster than the control ones. In addition, evidence from tissue studies indicates that in comparison to control groups the inflammation phase of wound healing was shorter in experimental groups.

Conclusion: The current study indicates that Lactobacillus acidophilus accelerates the process

of wound healing. The results of present study is in agreement with the results of previous ones that indicate the positive effects of other probiotic lactic acid bacteria on the process of wound healing.

Keywords: Probiotic, Lactobacillus Acidophilus, Burn Wound, Wistar Rat

Effects of Lactobacillus Rhamnosus on Healing Process of Second Degree Burn Wound in Wistar Rats

Amir Abbas Barzegari [1], Alireza Alihemmati, Masoud Hashemzaei, Soroush Soltani, Behrooz Naseri Majdani

1. Assistant Professor, Department of Physiology, University of Maragheh, Maragheh, Iran

Corresponding Author: Amir Abbas Barzegari, E-mail: barzegaridoctora@gmail.com

ABSTRACT

Background: Burn is one of health problems that humankind has been encountered with in the history. Now, Silver Sulfadiazine, as an antibacterial agent, is the drug that preferentially used for treatment of burn wounds. Previous investigations showed that the drug has no role in accelerating the process of wound healing and furthermore it may have some side effects. Therefore, the necessity of developing new drugs for burn wound healing is under consideration. For many years, probiotic bacteria have been used in health and industry as safe and beneficial agents. In previous studies, the benefits of some probiotic bacteria on skin health were shown. Moreover, some studies on wound healing process indicates that some strains of probiotic bacteria may accelerate the process of wound healing either in burn wounds or other kinds of wounds. Considering that the effects of probiotics are strain-dependent, in the present study the effects of Lactobacillus rhamnosus on the process of wound healing in second degree burn wounds evaluated in male rats.

Material and Methods: In the present study 60 male Wistar rat were used. The rats randomly divided in 12 equal groups. Induction of second degree burn wounds were conducted by a hot aluminum bar in the back of rats. Four groups of rats received no treatment as negative control groups. Four groups received vehicle ,eucerin, as positive control groups and four groups received probiotic bacteria in eucerin. The process of wound healing was assessed by measuring the wound areas and tissue sampling in days of 1,3,7,14 after induction of injury.

Results: The area of wounds were significantly smaller in experimental group than the control ones in days of 3 and 7 after induction of wounds ($P<0.05$). Tissue section of wound area showed

that the probiotic bacteria may reduce the period of inflammation of wound healing process.

Conclusion: The results of present study is favorable to previous researches as in those researches some strain of probiotics could accelerate the process of wound healing. For many years, the immunity of the bacteria to human health was documented, as many probiotics have been used in dairy products and in some drugs. Therefore, with more researches on the field we can be hopeful for development of better drugs for healing of burn wounds.

Keywords: Lactobacillus Rhamnosus, Wistar Rat, Burn Wound

Effects of Ozone Therapy on Wound Healing Acceleration in Diabetic Foot Ulcers

Mansoureh Farhadian

Tehran University of Medical Sciences (TUMS), Tehran, Iran

Corresponding Author: Mansoureh Farhadian, E-mail: mf_farhadian@yahoo.com

ABSTRACT

Background: Diabetes is a serious chronic disease in the world, especially in Middle East and Iran. It is associated with serious complications if it is not controlled. It can lead to amputation of the foot, reduced quality of life and even mortality. One of the major problems of diabetic patients is necrotic leg ulcers. The ulcers not only create problems for patients but they lead to enormous costs for families and communities. For this reason, several methods have been introduced to prevent amputation and diabetic foot complications. In this regard, the therapeutic effects of ozone can be due to its mechanism, examined. In this regard, the therapeutic effects of ozone can be examined due to its mechanism.

Material and Methods: infection is one of the results of burns, surgery and all ulcers which often lead to serious complications and death. During the past few decades, the strong anti-bacterial effect of ozone has been studied. The ozone with minimal side effects is effective in destroying resistant bacteria and it costs lower compared to drugs. This study has included 50 patients with different degree diabetic foot ulcers. The evaluation form of Association of Canada has been used to evaluate patients. These patients were enrolled consecutively from 2013-2016.

Results: The findings show the efficacy of ozone therapy in patients with various degrees of foot ulcers. It will be reported completely and by detail in the full text of paper.

Conclusion: Ozone can be used as one of the effective components in diabetic foot ulcer treatment. We treated a large number of patients who were candidates for foot amputation. However, patient education and appropriate diet and exercise can affect the outcome.

Hyper Baric Oxygen (HBO) as treatment for Ostheo Radio Necrosis

Saeid Farzaneh

Anesthesiologist & HyperBarist, Thechnical Manager of Bahar HBOT Center in Isfahan, Wound Care & Hyper Baric Medicine Trainer, San Antonio, Tx, USA

Corresponding Author: Saeid Farzaneh, E-mail: dsfarzaneh@gmail.com

ABSTRACT

One of the malignant side effects of radiation in treatment of maxilofacial malignancies is ostheoradionecrosis.

Dr. Marx studies shows

0.5 to 9 percent of these treatments result in ORN and the ethiology of this side effect was avascular, aseptic necrosis. In the US nearly one half of patients receiving HBO are being treated Radiation injury.

HBO by enhanced vascularity and cellularity and mobilize stem cells at the site of radiation , treat ORN.

In my practice, 12 patients with ORN in mandibule receive 40 sessions of HBO in 2.4 ATA, 90 minutes daily and all of them has been treated.

Effects of Autologous Fibroblast Transplantation and Low-Level Laser Therapy in Healing Process of Grade Three Burn wounds in Diabetic Patients

Noosh Afarin Kazemikhoo [1], Sona Zare [2,3], Soheil Mokmeli [4], Mostafa Dahmardehei [5], Reza Vaghardoost [5], Mahnoush Momeni [5], Fereshteh Ansari [6], Mohammad Ali Nilforoushzadeh [7]

1. Skin Diseases and Leishmaniasis Research Center, Isfahan University of Medical Sciences, Isfahan, Iran

2. Skin and Stem Cell Research Center, Tehran University of Medical Sciences, Tehran, Iran

3. Department of Biology, Faculty of Science, Islamic Azad University, Hamedan branch, Hamedan, Iran

4. Laser Therapist and Instructor, Canadian Optic and Laser Center, BC, Canada.

5. Assistant Professor, Burn Research Center, Department of Plastic and Reconstructive Surgery, Iran University of Medical Sciences, Tehran, Iran

6. PhD Student of Epidemiology, Tehran University, Tehran, Iran

7. Professor, Skin and Stem Cell Research Center, Tehran University of Medical Sciences, Tehran, Iran

Corresponding Author: Mohammad Ali Nilforoushzadeh, E-mail: dr_nilforoush@yahoo.com

ABSTRACT

Objective: This case series describes successful management grade 3 burn ulcers in 10 diabetic patients using Autologous Fibroblast Transplantation along with Low-Level Laser Therapy.

Background: Low Level Laser Therapy (LLLT) has been used as an effective therapeutic modality since the mid-sixties. Although there are several clinical studies using LLLT in wound healing, especially diabetic, pressure and venous ulcers, but there are rare reports of using this technique in burn ulcers. In this study, for the first time we used LLLT along with antilogous fibroblast skin transplantation to treat grade 3 burn ulcers in diabetic patients.

Material and Methods: Ten diabetic patients with grade 3 burn ulcer, candidate for skin graft surgery entered the study. 1 Cm2 was biopsied using a punch. Fibroblasts were extracted and cultured in-vitro. Patients were treated using LLLT in 3-4 weeks that took time for fibroblast cultures to become ready to use. Laser irradiation was done using a red laser, 650 nm, 2 J/Cm2 for the bed of ulcer and 6 J/Cm2 for the margins every other day for 7-10 sessions. When cultured

fibroblasts were ready, a thin layer of fibroblast suspension was applied to the base of ulcer and was fixed using dressing. Patients were evaluated every other day until complete healing.

Conclusion: We conclude that this method can be used as an effective method for treating large wounds, especially in complicated patients including diabetics.

Keywords: Low Level laser Therapy, Wound Healing, Burn Ulcer, Regenerative Medicine

Minimally Invasive Treatment of Herniated Disc

Mohammad Nazari

Interventional Radiologist, Wounnd Healing and Repair Center, ACECR, TUMS Branch

Corresponding Author: Mohammad Nazari, E-mail: nazari1358@yahoo.com

ABSTRACT

Disc herniation is the most common cause of lumboradicular pain and is the most frequent indication for spine surgery. The rate of failure after surgery, even with "microsurgical" access , for a herniated disc is variable owing to the onset of symptoms linked to failed back surgery syndrome. For this reason surgeons are now much less aggressive in bringing patients to the operating room for discectomy.

The few exceptions include clinical and morphologic criteria such as paralyzing sciatica, cauda equina syndrome, free disc fragments, rapid progressive neurologic deficit, and clinical symptomatology unresponsive to medical and physical therapy for more than 3 months.

These considerations have stimulated research into newer techniques to improve patient outcome. At the same time, advances in percutaneous techniques by interventional procedures (chemonucleodiscolysis with chymopapain, aspiration of the nucleus according to the technique of Onile, intradiscal electrothermal therapy [IDET],laser discectomy, nucleoplasty, intradiscal oxygen- ozone therapy) have minimized the invasive nature of surgical techniques and avoid complications such as surgery-related infection.

All percutaneous procedures are mildly invasive, needing only a short hospital stay. By avoiding the spinal canal, these techniques also eliminate the risks of postoperative scarring linked to surgery, which are often responsible for recurrence of pain. Percutaneous techniques can also be repeated in the same patient without precluding the need for traditional surgery if they should fail.

oxygen-ozone therapy is an effective and extremely safe option to treat lumbar disk herniation that has failed to respond to conservative management, before recourse to surgery or when surgery is not possible.

Clinical Study of Intravenous Effect of Low Level Laser Therapy in Diabetic Foot Ulcers Wagner 2 and 3

Hamed Salehbarmi [1], Mohammad Kazazi [2], Reza Kazazi [3], Azadeh Negaresh [4]

1. Resident of Clinical Pharmacy, Tehran University Medical Science (TUMS), Department of Pharmacology, Tehran, Iran
2. Cardiovascular Surgeon, Department of Heart Surgery, Milad Hospital, Tehran, Iran
3. Student, Iran University Medical Science (IUMS), Medical School, Tehran, Iran
4. Student, Islamic Azad University Medical Branch of Tehran, Medical School, Tehran, Iran

Corresponding Author: Hamed Salehbarmi, E-mail: salehbarmi@gmail.com

ABSTRACT

Diabetic foot ulcers in diabetic patients is one of the most common problems and failure to provide a solution to make the disease has become a huge problem. Low level lasers have a good impact on open wounds and injuries aim of this study was to evaluate the effect of low level laser therapy on diabetic ulcers.

Methods: In this study, 40 patients with type 2 diabetes who suffer from diabetic ulcers Wagner 2 and 3 are for treatment in the study and were treated with LLLT. For light therapy rejected in the red range of J / point2-1 the wound bed and infrared ranges J / point 4-2 in the margin next to wound healing and laser venous cannula into a vein and IV therapy investigated by laser treated, treatment sessions 20 sessions every other day, and until the healing lasted two sessions in weeks.

Results: completely after 20 sessions of full recovery for all wounds were taken in follow-up 6 months later complication were'nt seen in patients.

Conclusion: Low level laser therapy is one of the safest ways for diabetic foot ulcer that was uncomplicated and better speed than traditional methods and better treatment outcome reports.

Keywords: Low Level Laser Therapy, Diabetic Foot Wound, IV Therapy Laser, Type 2 Diabetes

Effects of He/Ne Low Level Laser Therapy on Wound Healing After Amputation

Hamed Salehbarmi [1], Mohammad Kazazi [2], Reza Kazazi [3], Azadeh Negaresh [4], S . Sheybani [3]

1. Resident of Clinical Pharmacy, Tehran University of Medical Science (TUMS), Department of Pharmacology, Tehran, Iran
2. Cardiovascular Surgeon, Milad Hospital, Heart Surgery Department, Tehran, Iran
3. Medical Student, Iran University of Medical Science (IUMS), Medical School, Tehran, Iran
4. Medical Student, Islamic Azad University Medical Branch of Tehran, Medical School, Tehran, Iran

Corresponding Author: Mohammad Kazazi, E-mail: drkazazi@yahoo.com

ABSTRACT

Shorten time the healing period wounds of surgery has many advantages. Wound healing is a complex phenomenon, but organized. Identified and coordinated processes such as reconstruction, movement and proliferation of parenchymal cells and connective tissue cells and rebuild tissues are involved. This study aimed to investigate the effects of low-level laser with a wavelength of 635 nm excitation processes and accelerate wound healing after amputation was performed.

Material and Methods: In this experimental study, 30 people with type 2 diabetes who develop foot ulcers and necrosis finger had been done. After amputation and dressing in the intervention and control patients were divided into two groups. The intervention group received laser for 8 minutes. After two weeks since the surgery, the affected area in both groups with respect to the same conditions autopsy was performed and all samples were studied by microscopic study.

Results: The results showed a significant increase in the number of laser beams connective tissue fibers, fibroblasts and proliferation of small blood vessels in granulation tissue and lead to a significant reduction in the intervention group were there in diameter than the control group.

Keywords: Low Level Laser Therapy, Diabetic Foot Wound, IV Therapy Laser, Type 2 Diabetes

A Short Dive in Tissue Healing

Ali Davoodi

Department of Dental Biomaterials, School of Dentistry, Tehran University of Medical sciences, Tehran, Iran

Corresponding Author: Ali Davoodi, E-mail: drfatemi@gmail.com

ABSTRACT

As times goes by, new aspects of biologically driven concepts of healing processes and factors affecting this complex phenomena show up. Not only the mediators and chemical factors- as were thought before - but surprisingly, the geometrical and 3D spaces can apparently influence the treatment outcomes. One the other hand, some capabilities such as producing targeted peptides in combination with proper scaffold administration will positively promote healing prognosis, among which the SocketKAGE, SocketKAP, BMP2 driven and VEGF driven peptides can be mentioned.

Electrospinning Nanofibers Production and its Medical Applications: Wound Healing, Drug Delivery and Tissue Regeneration

Reza Hosseinzadeh [1], Khatereh Khorsandi [1], Maryam Jahanshiri-Moghadam [1]

1. Medical Laser Research Center, ACECR, Tehran, Iran

Corresponding Author: Reza Hosseinzadeh, E-mail: chem.reza@gmail.com

ABSTRACT

In the last years, the health-care services have registered worldwide an increased number of patients suffering from chronic wounds and ulcers. Current strategies to treat chronic wounds offer limited relief to the 7.75 million patients. Wound dressings play an important role in a patient's recovery from health problems, as unattended wounds could lead to serious complications such as infections or, ultimately, even death. To date, much progress has been made through the use of nano-medicine in wound healing due to the ability of such materials to mimic the natural dimensions of tissue. Electrospun materials are promising scaffolds due to their light-weight, high surface-area and low-cost fabrication, Electrospun nanofiber scaffolds have been shown to accelerate the maturation, improve the growth, and direct the migration of cells in vitro. Electrospinning is a process in which a charged polymer jet is collected on a grounded collector; a rapidly rotating collector results in aligned nanofibers while stationary collectors result in randomly oriented fiber mats. Recently, the aligned electrospun nanofibers used and reported for tissue regeneration purposes. Researchers are aiming to new heights for developing wound dressings with properties and a sophistication unheard of with the usage of various synthetic and natural polymers that are biocompatible and biodegradable and can actively support and supplement a quick deposition of healthy tissue. Moreover, using such materials and polymers at the nanoscale presents unprecedented properties such as high-surface area and Nano porosity valuable for the intended goal. With that goal in mind, researchers are using and developing different techniques to create composites by incorporating fibers with growth factors, vitamins and other biomolecules known to encourage a healthy healing process. In current review the progress in application of electrospinning nanofiber polymers, biopolymers and composites in wound healing and tissue engineering were discussed.

Keywords: Electrospinning, Nanofibers, Wound Healing, Biocompatible Polymers, Drug Delivery, Tissue Engineering

Novel Approaches in Skin Tissue Engineering

Parinaz Abdollahiyan

Nano Materials, Maragheh University, Maragheh, Iran

Corresponding Author: Parinaz Abdollahiyan, E-mail: parinazabd68@gmail.com

ABSTRACT

Skin is a large organ in body with renewal ability in mild levels but not in hard injuries conditions. So current methods among allographs and autographs help patients to treat; these methods have some disadvantages and adverse effects which induced to apply tissue engineering methods, where a nature-like tissue will accelerate. It is based on three principles among scaffold, growth factor and cells. An important point in this approach is to choose proper scaffold, growth factor and stem cells. Scaffolds use not only as extra cellular matrix but also in agent deliveries. They have special characteristics in order to use in tissue engineering scaffolds such as porosities, for better cell adhesion and proliferation, flexibility, to gain a native-like skin tissue, biocompatibility, for low immune responses, biodegradable and hydrophil nature, to maintain wounds moistures. They can use in 3D, plate, microsphere and fibrous forms in skin tissue regeneration. Exactly a cell loaded scaffold will implant in hard skin wounds and encapsulating growth factors to better proliferate and migrate. Also proper stem cells have to choose such as bone marrow stem cells which are desirable for tissue regeneration. In these paper different kinds of natural and synthetic scaffolds, growth factors and stem cells and also some improving methods are investigated in order to achieve to a better native-like skin tissues.

Keywords: Skin Tissue Engineering, Nanostructure, Scaffold, Wound

Poster Presentations in Clinical Sciences

Approaching Laser Therapy for Pressure Ulcers

Akram Shahrokhi [1], Nooshin Elikaei [2]

1. Faculty of Nursing & Midwifery School, Qazvin University of Medical Sciences, Qazvin, Iran
2. Student of Critical Care Nursing, Nursing & Midwifery School, Qazvin University of Medical Sciences, Qazvin, Iran

Corresponding Author: Nooshin elikaei, E-mail: nooshinelikaei@gmail.com

ABSTRACT

The high prevalence of pressure ulcer(PU) might be considered as a negative determinant of quality of care. To prevent PU complications, different appropriate treatments should be utilized,and nowadays non-invasaive treatments such as laser therapy are more recommended.

Low level laser therapy(LLLT) was initiated since 1960 and its medical utilization has been more noticeable in recent years. LLLT is a continuous wave or pulsed light that contains a fixed beam with a relatively low density of 0.04 – 5 joules per square centimeter, it is applied as a low power laser by use of red or infrared beams with wavelength 600-1100 nanometer and power outlet of 1-500 MW. Low density laser therapy could accelerate cell proliferation through biochemical, bioelectrical and bioenergetics effects, whereas high density laser therapy could be a suppressive measure. Healing process of the tissues is an innate immune response to restore the integrity of the tissue through consequences of coagulation, inflammation, granulation tissue formation, and epithelial tissue regeneration. Outcomes of LLLT are including:1)increase in the production of adenosine triphosphate (ATP), 2) stimulate blood flow in small vessels, and 3) formation of new vessels on previous vessels.

Material and Methods: According to the inclusion criteria, Databases Pubmed, Sciencedirect, Proquest and Google Scholar were searched between 2003-2016 by key words including pressure ulcer, pressure sores, laser therapy, low level laser therapy, PU healing, PU treatment. Totally 32 original articles and systematic reviews had including criteria and they were assessed.

Results: According to 29 studies LLLT has positive effects on healing of Pressure ulcers in comparison to other treatments. LLLT has been effective on pressure ulcers' healing process according to its wavelength and dosage, pressure ulcer site, and duration of the treatment. But there were three studies which did not support considerable effect of application of LLLt on pressure ulcers' healing.

Conclusion: The results showed that more studies and meta-analysis need to make decision about application of LLLT as an exact treatment to accelerate healing of pressure ulcers.

Wound Dressing with Silver Nanoparticles

Maryam Beheshtifar

Nursing Student, Faculty of Nursing, AJA University of Medical Science, Tehran, Iran

Corresponding Author: Maryam Beheshtifar, E-mail: maryam.beheshtifar@gmail.com

ABSTRACT

Background: Body skin plays an important role in hemostasis and prevention of invasive microorganisms. In case of skin damage quickly cover the wound dressing is essential. During the research the researchers using nanoparticles of silver and polymer materials have succeeded in producing novel dressings that can repair all chronic and non-chronic wounds including infected wounds, diabetic ulcers and bed sores in the shortest possible time.

Material and Methods: This research is a descriptive study and is a review one. It has been done by using past research survey related to the subject matter at the library, theses and data bases: including: Sid, Google Scholar, PubMed, Science Direct, Magi ran.

Results: Because of the distinctive silver antimicrobial performance against a range of bacteria, yeasts, fungi and viruses, among other Nano metals, has wider application. Silver through disruption of the cytochrome respiratory chain or electron transport system and prevent the proliferation of germs and the DNA connection to put their antimicrobial plays. Silver also has anti-inflammatory effects and epitheliazation also able to quickly increase this to 40%. The main idea of dressings with silver nanoparticles is to combine wound treatment with wet method along releasing silver in the wound for controlling infection and wound healing is in motion or speed up the process.

Conclusion: Dressing of silver nanoparticles can be used to make dressings; to control the infection and accelerate healing will be used; silver nanoparticles also reduces the cost, pain during dressing change, reduce and improve wound exudates chronic wounds faster. Depending on the patient and his condition to cover the wound; Dressing of silver nanoparticles can be used in health centers.

Keywords: Wound Dressing, Silver Nanoparticle

Cell Therapy for Burn Patients

Faeze Jahangiri [1], Sona Zare [1,2], Mohammad Ali Nilforoushzadeh [1,3], Somayeh Hejazi [1], Mostafa Dahmardehei [4]

1. Skin and Stem Cell Research Center, Tehran University of Medical sciences, Tehran, Iran
2. Department of Biology, Faculty of Basic Sciences, Islamic Azad University, Hamedan Branch, Hamedan, Iran
3. Skin and Leschmaniosis Research Center, Esfahan University of Medical Sciences, Esfahan, Iran
4. Burn Research Center, Shahid Motahari Hospital, Iran University of Medical sciences, Tehran, Iran

Corresponding Author: Faeze Jahangiri , E-mail: faeze.jahangiri@yahoo.com

ABSTRACT

Stem cell therapy has emerged as a promising new approach in almost every medicine specialty. This vast, heterogeneous family of cells are now both naturally (embryonic and adult stem cells) or artificially obtained (induced pluripotent stem cells or iPSCs) and their fates have become increasingly controllable, thanks to ongoing research in this passionate new field. We are at the beginning of a new era in medicine, with multiple applications for stem cell therapy, not only as a monotherapy, but also as an adjunct to other strategies, such as organ transplantation or standard drug treatment. Regrettably, serious preclinical concerns remain and differentiation, cell fusion, senescence and signalling crosstalk with growth factors and biomaterials are still challenges for this promising multidisciplinary therapeutic modality. Severe burns have several indications for stem cell therapy, including enhancement of wound healing, replacement of damaged skin and perfect skin regeneration – incorporating skin appendages and reduced fibrosis –, as well as systemic effects, such as inflammation, hypermetabolism and immunosuppression.

Keywords: Cell Therapy, Stem Cells, Burn

Hyperbaric Oxygen Therapy for Treating Chronic Wounds

Marzieyh Khatooni [1], Fatemeh Samiee Siboni [1], Farnoosh Moafi Gafari [1], Hamideh Hajnasiri [1], Fariba Abdollahi [2]

1. Member of Academic Board, Qazvin University of Medical Sciences, Qazvin, Iran
2. Student of Master of Science in Nursing, Iran University of Medical Sciens (IUMS), Tehran, Iran

Corresponding Author: Marzieyh Khatooni , E-mail: susan_khatoni@yahoo.com

ABSTRACT

Background: chronic wounds are wounds that take a long time to heal, do not heal, or recur; these wounds are often ulcers associated with diabetes or arterial or venous disease (poor blood circulation) and pressure ulcers. One characteristic of chronic wounds is that the wound tissues are hypoxic (have low oxygen levels). Chronic wounds are commonly occurring and reduce the quality of life of those affected and are significant socioeconomic problem.

Material and Methods: A literature review of clinical and basic science studies regarding oxygen and wound healing was conducted to assess benefits of adjunctive hyperbaric oxygen therapy (HBOT) for healing chronic wounds. The aim is to improve the understanding of the role of oxygen in wound healing and to advance our management of wound patients.

Results: Many experimental and clinical observations have shown wound healing to be impaired under hypoxia. Hypoxia appears to inhibit the wound healing process by blocking fibroblast proliferation, collagen production, and capillary angiogenesis and to increase the risk of infection. Hyperbaric oxygen therapy (HBOT) is a treatment designed to increase the supply of oxygen to wounds that are not responding to other treatments. HBOT involves people breathing pure oxygen in a specially designed compression chamber (such as those used for deep-sea divers suffering pressure problems after resurfacing).HBO improves microvascular supply by increasing the amount of oxygen so that gaseous diffusion can occur in relatively avascular or ischaemic areas. Normal fibrobiast proliferation and collagen production requires a local oxygen tension level of 20 - 40 mm of Hg. Raising this threshold level to 40 - 50 mm of Hg stimulates greater degree of neovascularisation which may favour definitive local healing. Oxygen is bactericidal to certain anaerobic or microaerophilic organisms because they lack the appropriate enzymes (superoxide

dismutase and catalase) necessary to protect them in highly oxygenated environments. Advocates have suggested that the experimentally demonstrated effects of HBOT on improving wound tissue hypoxia, enhancing perfusion, reducing edema, downregulating inflammatory cytokines, promoting fibroblast proliferation, collagen synthesis, and angiogenesis make it a useful adjunct in clinical practice for "problem wounds," such as diabetic foot ulcers and pressure ulcers. Randomized trials compared the effects of HBOT with standard wound care. They found that HBOT was associated with statistically significantly higher rates of wound healing, lower rates of operative interventions (debridement, amputation, or skin flap or graft; and fewer lower extremity amputations. HBOT is also touted for eradicating difficult to treat soft tissue and bone infections by mechanisms that include killing microorganisms, improving leukocyte and macrophage function, and enhancing the effect of antimicrobials .

Conclusions: Adjunctive treatment with HBOT facilitates healing of chronic wounds.It is cost effective treatment, and significantly can reduced the risk of major amputation and increases the likelihood of wound healing.

Keywords: Hyperbaric Oxygen Therapy, Chronic Wound, Healing

Hyperbaric Oxygen; Unknown Therapeutic Modality for Diabetic Foot Ulcer

Amir Khoshvaghti [1], Mohammad Hoseyn Lashgari, Amir Nezami Asl, Abolfazl Khademi, Fariba Abdollahi, Reza Eslami, Mahmood Momenzade

1. Aerospace Medicine Research Center, Aerospace and Subaquatic Medicine Faculty, AJA University of Medical Sciences, Tehran, Iran.

Corresponding Author: Amir Khoshvaghti, E-mail: anatomygray2009@gmail.com

ABSTRACT

Background: Diabetes is a chronic disease. Lifestyle and demographic changes have resulted in much more diabetics with increasing morbidity and mortality. 160 years ago, Calvi and Hodgkin described the complication of diabetic foot ulcers. 25% of the diabetics will endure an ulcer in their life. Chronic wounds affect 6.5 million people of USA with 25 billion dollars of health expenditure costs. 1–2% of population in developed countries will encounter a chronic wound in their life. Diabetic foot ulcers as a common and serious complication have local and systemic, private and social consequences. 100% oxygen is prescribed at pressures greater than atmospheric pressure in hyperbaric oxygen therapy (HBOT). HBOT increases tissue oxygenation and has many medical indications.

Material and Methods: HBOT is unknown in many countries yet. Systematic review of pubmed articles has been done up to 2016.

Results: In 1992, Doctor et al from India concluded HBOT as a safe and beneficial adjuvant therapy in chronic diabetic foot ulcers. Faglia et al from Italy declared HBOT effectiveness in multidisciplinary therapeutic protocol of ischemic foot ulcers in 1996. Results of review of Goldman in 2009 showed 95% reduction in chance of amputation, and 95% improvement in chance of healing, and reduction in risk of amputation for patients with diabetic foot ulcers complicated by surgical infection. He also denoted moderate promotion in healing of arterial ulcers, and refractory vasculitic ulcers, plus low to moderate successful flaps and grafts.

Conclusion: Mechanisms and effects of treatment by hyperbaric oxygen in burns are as following: Mechanisms involved are: Increasing the concentration gradient for oxygen, reduction of bacterial load, reduction of edema, increase of angiogenesis, collagen synthesis, granulation tissue formation, epithelialization, and wound contraction. In general, HBOT causes decrease of mortality, length of

hospital stay, number of surgeries, and cost of care. Subsequent studies demonstrated HBOT as an adjunct treatment care significantly improves morbidity and mortality, reduces length of hospital stay, and lessens the need for surgery.

Keywords: Wound, Diabetes, Hyperbaric Oxygen, Treatment, Ulcer, Healing

The First Persian Medical Textbook and Wound

Amir Khoshvaghti [1], SJ Hoseyni Shokuh [1], Mohammad Hoseyn Lashgari [2], H.Rahimiyan [2]

1. Infectious Diseases Research Center, Aerospace and Subaquatic Medicine Faculty, AJA University of Medical Sciences, Tehran, IRAN.
2- Surgery and Trauma Research Center, AJA University of Medical Sciences, Tehran, IRAN.

Corresponding Author: Amir Khoshvaghti, E-mail: anatomygray2009@gmail.com

ABSTRACT

Hidayat-al-Myta'allimin fil-ttib has been written by AbuBakr Rabi ben Ahmad al-Ahkhawayini al-Bukhari between 1000 and 1170 AC. It is the first medical textbook which has been written in Farsi (old language). Al-Ahkhawayini prepared and wrote the book because of his son's request. He has noted two other books of himself but there is not any track of these books. He was among the second generation Iranian physicians after the Great Rhazes. The book is a fluent edition for general population but also contains scientific subheadings in anatomy and physiology. The writer has mentioned his experiments in treating the patients. It has been postulated that most of the subjects are in agreement with scientific basics of modern medical textbooks. It was chosen as a reference by many physicians for many years.

Hidayat-al-Myta'allimin fil-ttib has 3 parts and 200 chapters; first part with 51 chapters, 130 chapters about special diseases and therapeutics in second part, and third part with 19 chapters about main subjects such as fever, wound, pulse, and public health.

Chapter of the wound contains three pages while some diseases are mentioned in one paragraph only. First the writer describes the wound(s). Then he gives the clues for intact skin and its functions. The writer has mentioned kinds of wounds including simple and uncomplicated ones up to complicated wounds with injuries to tissues and organs around. Treatments include from cleansing, wound dressing, disinfecting, suturing, and many other general and special considerations. He also describes burns.

al-Ahkhawayini believes 2 aspects for medicine; theory and practice. According to his opinion, practical aspect of medicine should consider two main aims: Keeping health in healthy people and returning health to the patients.

Keywords: Treatment, Health, Wound Dressing, Burn.

Hyperbaric Oxygen for Thermal Burns; Unknown in Many Countries

Amir Khoshvaghti [1], SJ Hoseyni Shokuh [1], Mohammad Hoseyn Lashgari [2]

1. Infectious Diseases Research Center, Aerospace and Subaquatic Medicine Faculty, AJA University of Medical Sciences, Tehran, IRAN. 2- Surgery and Trauma Research Center, AJA University of Medical Sciences, Tehran, IRAN.

Corresponding Author: Amir Khoshvaghti, E-mail: anatomygray2009@gmail.com

ABSTRACT

Background: Thermal burns are still among major problems with local and systemic consequences. Its morbidity and mortality bears high financial cost on health systems in each country. Hyperbaric oxygen therapy (HBOT) is a sophisticated treatment modality; 100% oxygen is prescribed at pressures greater than atmospheric pressure in special chambers. HBOT has many medical indications including thermal burns but unknown in many countries.

Material and Methods: A review was designed with relevant keywords up to 2016.

Results: In 1965, HBOT was used in thermal burns for the first time. Rats were the first animals studied for effects of HBOT on pathophysiology of burns (1970). At 2004, the first systematic review was published. Hyperoxia, vasoconstriction in pre-capillaries, prevention of ischemia in derm, reduction of plasma exudation, preserving cellular metabolism, increase of tissue oxygenation, decrease of edema and fluid loss reduction are among mechanisms described for HBOT.

Conclusion: Reduction of mortality, staying in hospital, number of operations, and financial cost would be the results of HBOT. Every burn care center should have HBOT chambers (especially mono-place).

Keywords: Oxygen, Burn, Chamber, Healing

Maggot Therapy and Negative Pressure Wound Therapy as a Reasonable Appropriate Combination

Shiva Dehghan

Student of Medical Sciences, Isfahan University of Medical Sciences, Isfahan, Iran

Corresponding Author: Shiva Dehghan, E-mail: shiva2010med@yahoo.com

ABSTRACT

Negative - Pressure Wound Therapy (NPWT) is a powerful adjunct to surgical management of a wound or can be used in circumstances where surgery is not possible. The safety and efficacy of NPWT have been evaluated, in both acute and chronic wounds.

NPWT can only be successful when adequate and proper debridement has been performed.

Maggot therapy (bio debridement) employs the use of sterile larvae of the common greenbottle fly unable to ingest or significantly damage healthy human tissue and has the following three core beneficial effects on a wound: debridement, disinfection and enhanced healing.

In this paper we attempt to gather the reasons if they might be a Reasonable appropriate combine by review maggot therapy and NPWT mechanism of action discover their power and deficit points.

Keywords: Maggot Therapy, Negative Pressure Wound Therapy, Bio Debridement, Wound Healing, Wound

Regenerative Medicinefor Diabetic Foot Ulcer

Sona Zare [1,2], Mohammad Ali Nilforoushzadeh [1,3], Abdolreza Mohamadnia [4,5], Faeze Jahangiri [1], Mostafa Dahmardehei [6], Somayeh Hejazi [1]

1. Skin and Stem Cell Research Center, Tehran University of Medical Sciences, Tehran, Iran
2. Department of Biology, Faculty of Basic Sciences, Islamic Azad University, Hamedan Branch, Hamedan, Iran
3. Skin and Leschmaniosis Research Center, Esfahan University of Medical Sciences, Esfahan, Iran
4. Virology Research Center, National Research Institute of Tuberculosis and Lung Diseases (NRITLD), Shahid Beheshti University of Medical Sciences, Tehran, Iran
5. Department of Biotechnology, School of Advanced Technologies in Medicine, Shahid Beheshti University of Medical Sciences, Tehran, Iran
6. Burn Research Center, Shahid Motahari Hospital, Iran University of Medical sciences, Tehran, Iran

Corresponding Author: Sona Zare, E-mail: sonazarebio@gmail.com

ABSTRACT

Chronic or non-healing wounds are wounds that have not made significant improvements after several weeks or fail to respond to medical or surgical management. They are wounds that do not undergo the normal healing process that includes inflammation, proliferation and matrix deposition and remodeling. They can be caused by diabetes, poor circulation, burns, pressure and other conditions, and are characterized by redness, warmth and pain, increased drainage or drainage with an odor, tenderness and swelling. Therefore, they can be found in patients with issues and conditions that inhibit tissue repair, including diabetic wounds, vascular insufficiency ulcers, compromised amputation sites, radiation necrosis and gas gangrene.

People with diabetes are especially at risk to develop chronic wounds, usually in the form of foot ulcers. Although traditional wound care often aids the healing process of chronic, non-healing wounds, as many as one-third of these wounds fail to heal. Regenerative medicine technologies thus have great potential to bridge the success rate gap for treatment of these ailments. The field of regenerative medicine has been focusing next generation technologies to help heal cutaneous wounds. One successful approach is the creation and use of three-dimensional scaffolds as extracellular matrix analogs that mimic the natural extracellular matrices. These scaffolds, when seeded with a range of molecules, including fibroblasts (the cells that synthesize the extracellular matrix and collagen), help foster cell adhesion, growth and differentiation to form skin functional and structural tissue. Stem cells, growth factors, chemokines, cytokines and other molecules are also being explored as regenerative medicine products to renew endogenous healing processes in chronic, non-healing wounds.

Keywords: Regenerative Medicine, Wound Healing, Foot Ulcer

Isolation, Culture and Transfection of Human Skin Keratinocytes: Application in Cell and Gene Therapy in Wound Patients

Sona Zare [1,2], Faeze Jahangiri [1], Mohammad Ali Nilforoushzadeh [1,3], Mostafa Dahmardehei [4], Somayeh Hejazi [1]

1. Skin and Stem Cell Research Center, Tehran University of Medical sciences, Tehran, Iran
2. Department of Biology, Faculty of Basic Sciences, Islamic Azad University, Hamedan Branch, Hamedan, Iran
3. Skin and Leschmaniosis Research Center, Esfahan University of Medical Sciences, Esfahan, Iran
4. Burn Research Center, Shahid Motahari Hospital, Iran University of Medical sciences, Tehran, Iran

Corresponding Author: Sona Zare, E-mail: sonazarebio@gmail.com

ABSTRACT

Human keratinocytes could be used in the repair of damaged skin, in tissue engineering applications, gene therapy and recently, the generation of iPS cells. We isolated human keratinocytes from foreskin and subsequently cultured them on fibronectin, collagen type I, gelatin and laminin-coated dishes that contained three different types of serum-free medium. We developed improved conditions for efficient transfection of these human keratinocytes by testing three common transfection methods and a GFP plasmid vector. The isolated cells showed typical keratinocyte morphology and expressed the epithelial cell specific antigen, cytokeratin 14. Collagen type 1, epilife medium and lipofectamin 2000 gave the best results for isolation and transfection of human keratinocytes. This protocol can be used as a reproducible, simple and efficient method for isolation, cultivation and genetic manipulation of human keratinocytes, which may be useful in cell and gene therapy applications.

Keywords: Isolation, Culture, Transfection, Keratinocyte, Cell Therapy, Gene Therapy

Regenerative Medicine in Burn Wound Healing

Sona Zare [1,2], Faeze Jahangiri [1] , Mohammad Ali Nilforoushzadeh [1,3], Mostafa Dahmardehei [4], Somayeh Hejazi [1]

1. Skin and Stem Cell Research Center, Tehran University of Medical sciences, Tehran, Iran
2. Department of Biology, Faculty of Basic Sciences, Islamic Azad University, Hamedan Branch, Hamedan, Iran
3. Skin and Leschmaniosis Research Center, Esfahan University of Medical Sciences, Esfahan, Iran
4. Burn Research Center, Shahid Motahari Hospital, Iran University of Medical sciences, Tehran, Iran

Corresponding Author: Sona Zare, E-mail: sonazarebio@gmail.com

ABSTRACT

Delays in burn wound closure worsen a patient's susceptibility to infection, prolong pain, increase the total number of operative procedures, increase the incidence of hypertrophic scarring, and lengthen hospital stays. Stem cell therapies in wound care may lessen these morbidities. Specifically, the burn wound has unique characteristics that have to be considered when designing a clinical trial for stem cell therapy applications: it is an ischemic wound, with an altered pH and temperature, prone to infection and development of chronic sequel, such as non-healing ulcers and hypertrophic scarring. Furthermore, a major burn represents a handicap, with uncovered wounds open to air, which requires frequent operations and dressing changes, and with long periods of immobilized hospital stay, which involve frequent position changes and physiotherapy, to avoid pressure sores, enhance rehabilitation and improve overall prognosis. This dynamic paradigm popularized the use of polymeric films for the repair and closure of wounds. These films are semipermeable and transparent materials that create an accelerated healing environment while avoiding dehydration, trauma and infection over the injury. Moreover, radiofrequency applied to wound-contacting iron oxide nanoparticles have been used to debride the wound may represent a novel burn treatment method, once stronger scientific evidence is available.

An ideal method for the effective administration of stem cells for burn patients has not yet been elucidated. Further comparison of the local and systemic effects in burn patients, associated with each route of stem cell delivery, needs to be performed. There is still not enough evidence in terms of analyzing systemic or local effects of stem cell delivery in burn patients, regarding different possible routes of administration.

Keywords: Isolation, Culture, Transfection, Keratinocyte, Cell Therapy, Gene Therapy

Relationship Between Hemodynamic Parameters and Risk of Pressure Ulcers Development in Patients after Open Heart Surgery

Jalil Azimian [1], Hossein Rafiei [2], Mojtaba Senmar [3]

1. Assistant Professor, Faculty of Nursing and Midwifery, Qazvin University of Medical Sciences, Qazvin, Iran
2. Social Health Determinants Research Center, Qazvin University of Medical Sciences, Qazvin, Iran
3. Student Research Center, School of Nursing and Midwifery, Qazvin University of Medical Sciences, Qazvin, Iran

Corresponding Author: Mojtaba Senmar, E-mail: senmarmojtaba@gmail.com

ABSTRACT

Background: Pressure ulcer development is a negative point for health care systems in the world. Firsth step in prevention of pressure ulcer is identifying risk factors of pressure ulcer. One group of patients that are at high risk of pressure ulcer development is who are under open heart cardiac surgery. However study about this group of patients is very limited. In present study we, examined relationship between the risk of pressure ulcer development in this group of patients and hemodynamic parameters.

Material and Methods: This descriptive analytic study performed in open heart cardiac surgery intensive care unit of Bou-Ali hospital in Qazvin, Iran. Eighty two patients who were under cardiac surgery were selected by using available sampling method. The risk of pressure ulcer development measured in three time; before surgery, after surgery (in time that patients were alert) and in time of patients discharge with using NPUAP and braden scale. Also patients' demographic characteristics and hemodynamic status recorded daily by researcher.

Results: Of the 82 patients, 36 (43.9%) were women and 46 (51.6%) were men. The mean age of participants were 60.93±10.52 year and the mean of cardiac Intensive Care Unit (ICU) stay were 2.87±0.96 days. Totally all pressure ulcers was stage I and II. Factors such as: mean of diastolic blood pressure during the first day (P = 0.04), mean of central venous blood pressure during the second day (P = 0.01) and mean of heart rate during the second day (P = 0.04) affect risk of

pressure ulcer development significantly.

Conclussion: Results of present study revealed that patients who are undergoing cardiac surgery are at high risk of pressure ulcers development and factors such as diastolic blood pressure, mean central venous pressure, mean heart rate increased this risk.

Keywords: Pressure Ulcer Development, Hemodynamic Situation, Cardiac Surgery

Exudate Management in Wound Care

Bahram Ghaderi [1,2]

1. Ph.D in Surgical Nursing, Hacettepe University of Ankara, Ankara, Turkey
2. Teaching Supervisor and Wound Manager in Shahid Madani Heart Hospital, Tabriz, Iran

Corresponding Author: Bahram Ghaderi, E-mail: ghaderi_b47@yahoo.com

ABSTRACT

Exudate can be defined as fluid leaking from a wound. It plays a central role in healing. Exudate is mainly water, but also contains electrolytes, nutrients, proteins, inflammatory mediators, protein digesting enzymes (eg matrix metalloproteinases (MMPs)), growth factors and waste products, as well as various types of cells (eg neutrophils, macrophages and platelets).

Although wound exudate frequently contains micro-organisms, their presence does not necessarily mean that the wound is infected.

In healing wounds, exudate supports healing and a moist wound environment. The main role of exudate is in facilitating the diffusion of vital healing factors (eg growth and immune factors) and the migration of cells across the wound bed. It also promotes cell proliferation, provides nutrients for cell metabolism, and aids autolysis of necrotic or damaged tissue.

As healing occurs, the amount of exudate produced usually decreases.

Although a moist wound environment is necessary for optimal wound healing, over- or under production of exudate may adversely affect healing. In order to enhance the body's ability to repair itself, the wound bed needs to be bathed with exudate, but not excessively. Getting the moisture balance correct is an important part of wound management. This aspect can be challenging, as wound exudate levels change during the healing process. This is why the ongoing assessment of wound exudate is so important.

Any factor that increases capillary leakage or predisposes to the development of tissue oedema (eg inflammation, bacterial contamination or limb dependency) may boost exudate production. Low exudate production may indicate a systemic problem, eg dehydration, hypovolaemic shock, microangiopathy, or may be a feature of ischaemic ulcers.

In wounds not healing as expected (ie chronic wounds), exudate appears to impede healing it: lows

down or even prevents cell proliferation
/interferes with growth factor availability
/contains elevated levels of inflammatory mediators and activated MMPs.

The increased proteolytic activity of chronic wound exudate is implicated in perpetuating wounds, damaging the wound bed, degrading the extracellular matrix, and causing periwound skin problems.

Effective exudate management can reduce time to healing, reduce exudate-related problems such as periwound skin damage and infection, improve patients' quality of life, reduce dressing change frequency and clinician input, and so, overall, improve healthcare efficiency.

In many cases, the overall aim of exudate management is to achieve a wound bed that is sufficiently moist for healing , but that does not cause problems such as maceration, whilst treating underlying contributory factors, enhancing patient quality of life, encouraging healing, addressing exudate-related problems and optimising healthcare resource use.

Dressings are the main option for managing exudate at wound level.

Where excessive exudate is a problem, or where exudate composition is suspected of impeding healing, removal of exudate from the wound bed is a priority.

Regular comprehensive assessment and documentation of the wound are essential for monitoring change and aiding decision-making. Volume, colour, thickness and odur of exudates are important in strategy taking in management. Documented improvement of the wound and progression towards treatment goals (usually healing) provide a clear indication that the wound environment enhancement provided by topical interventions has been successful.

The complications that may arise from poor exudate management are significant. Regular reassessment is necessary to highlight continued or emerging problems, and to prompt adjustments in management. When there is lack of progress, reassessment should include examination for factors beyond the wound that may be creating a barrier to healing. In addition, specialist referral may be considered.

Accurate patient and wound assessment is essential to inform the treatment and selection of suitable management. The wide range of modern and new exudates managements, such as dressing, vaccum therapy, compression and elevation are present and full knowledge about all of them is essential for accurate management of exudates.

Effects of HBOT on Chronic Wound Healing

Saeed Ghasemi [1]

1. Master of Critical Care Nursig , AJA Medical Sciences, Tehran, Iran

Corresponding Author: Saeed Ghasemi, E-mail: saeedghasemi5575@gmail.com

ABSTRACT

Background: A chronic wound is one in which healing fails to proceed through an orderly and timely process to produce anatomic and functional integrity, or proceed through the repair process without establishing a sustained anatomic and functional result. These wounds are often a surface manifestation of an underlying disease such as venous insufficiency ,arterial disease, or diabetes. Treatment tends to focus on treating the surface ulcer and commonly ends in nothing more than added expense without successful healing.The factors involved in the development of a chronic wound remain unclear.however, the common cause, is thought to be related to the detrimental effects of prolonged wound hypoxia .It has been suggested that while oxidant species, produced by neutrophils and macrophages within the wound, may serve as messengers to promote healing, overproduction may in fact overwhelm the immune system and delay healing. Chronic wounds can be arrested in any one of the stages of wound healing but disruption commonly occurs in the inflammatory or proliferative phases.excessive production can have a detrimental effect on healing by destroying growth factors and thus reducing the chemotactic and proliferative stimulus that these chemicals provide through neutrophil production of proteolytic enzymes and degrading ECM components. In chronic wounds, insufficient ECM is deposited leading to a weakened tissue that can easily rupture. Others have reported high levels of MMPs, which can lead to excessive ECM degradation

Material and Method: A review article , which compiled library resources and international magazines have been used immortal new world.

Results: Treatment of chronic wounds according to different causes , but the most important principle, eliminate the causes underlying causes of chronic wounds. Oxygen plays an important role in the physiology of wound healing. The use of hyperbaric oxygen with chamber to increase oxygen for the tissues and increase tissue oxygen levels and increase wound healing. Oxygen

therapy is hyperbaric oxygen 100 % more than 1/4 of the atmosphere for better blood perfusion of tissue that is poorly delivered. Reduce swelling and inflammation, increasing the activity of white blood cells , preventing the production of oxygen free radicals , increases tissue metabolism and stop the bacteria becomes chronic wound healing.

Conclusion: Hypoxia appears to inhibit the wound healing process by blocking fibroblast proliferation, collagen production, and capillary angiogenesis and to increase the risk of infection. Hyperbaric oxygen therapy (HBOT) has been shown to aid the healing of ulcerated wounds. we chronic wound healing and the use of hyperbaric oxygen as an adjunctive treatment for non healing wounds

Keywords: Chronic Wound, HBOT, Wound Healing

Application of Honey in Wounds Treatment: A Review Study

Davood Gheysari [1], Sajad Goudarzi [1], Zahra Fatemianzade [1], Faezeh Yavari [1], Abas Ebadi [2]

1. Student's Research Committee (SRC), Nursing School, Baqiyatallah University of Medical Sciences, Tehran, Iran

2. Assistant Professor, Nursing School, Baqiyatallah University of Medical Sciences, Tehran, Iran

Corresponding Author: Davood Gheysari, E-mail: gheisarii1995@gmail.com

ABSTRACT

Despite the progress made in the treatment of wounds, but there are still problems in the treatment of various wounds. Problems such as infection, amputation, prolonged wound healing, pain at the wound site and other problems. According to documents that there is honey in wound treatment and it is pointed out in the old and new texts. In this study, the use of honey in wound healing, harms and benefits of honey was checked. Also honey was compared with other treatment in wound treatment.

Material and Methods: This study is a systematic review study that review and exploration based on "honey" and "Wound treatment" and "care" from "seincedirect"," pubmed", "sinhall", "scopus" and "googleschoolar" databases in a period 2010-2016.

also at the first, to review non-repetition study were searched "chochran library"

Results: The results show that honey reduces recovery time in the treatment of shallow and superficial burns.

But to delay the treatment of deep burns and wounds and insect bites. Studies also showed that honey in the treatment of diabetic wounds increase the quality of life.and Reduce amputation/

And is a good alternative to conventional dressings.

The use of honey in Wound treatment venous leg, delays recovery.

But the information about use of honey in venous leg ulcers treatment and pressure wounds treatment is limited and requires to more study.

In many study have been shown anti-inflammatory and antibacterial properties of honey.

Conclusion: The therapeutic effect of honey on some wounds has been demonstrated but in some

wounds, honey dressing and common dressing was not significantly different.

Honey due to Anti-inflammatory and anti-bacterial properties, reduced wound complications, availability and easily dressing can be a good alternative to common dressing wounds. Of course, information is limited and requires further study in this field.

Keywords: Honey, Wound, Care, Usage

Comparison of Two Methods Open Sphincterotomy and Closed Sphincterotomy Anal Fissure

Zahra Fatemianzade [1], Zahra Mansouri [1], Sajad Goudarzi [1], Faeze Yavari [1], Davood gheisari [1], Zohre Vafadar [2]

1. Student's Research Committee (SRC), Nursing School, Baqiyatallah University of Medical Sciences, Tehran, Iran

2. Assistant Professor, Nursing School, Baqiyatallah University of Medical Sciences, Tehran, Iran

Corresponding Author: Zahra Fatemianzade, E-mail: z.fatemian12@gmail.com

ABSTRACT

Background: Anal fissure is the most common anorectal disease in all sex and age fissures developed to anal stenosis. Chronic diseas that do not respond to drug trapy must be surgery. In this study review has been perused the result and complications of open sphincterotomy and closed sphincterotomy.

Material and Methods: This systematic review study has been done in 2016 with comprehensive search in following database ISI web of science, science direct, scopus, pubmed, google scholar and some Iranian databases such as SID, Magiran, with main key words such as of chronic anal fissure, open sphincterotomy and closed sphincterotomy, greatly English and Persian languages, between 1996 to 2016 also with Randomized Clinical Trials methodology. From 10 selected articles that were evaluated with consort 2015, finally six eligible articles were entered to final review. (4 English article and 2 Persian article)

Results: results showed, there is no signification statistical difference with $P<0.05$ in terms of age ($p= 0/83$), sex ($p=0/30$), durations of disease ($p= 0/95$) between the two methods, but there is signification statistical difference with $P<0.05$ in terms of length of stay ($p= 0/003$), the duration of surgery ($p=0/001$), postoperative pain ($p=0/02$), in time for returning to work ($p=0/001$), These mentioned variables in closed sphincterotomy method is less than open sphincterotomy method. In none of these methods are hematoma and bleeding has stopped at 48 hours postoperative. Abscess is rarely observed in closed sphincterotomy. In open sphincterotomy can be seen gas incontinence that with the passage of time fades.

Conclusion: Due to better outcomes of closed sphincterotomy such as shorter operative time and less pain, closed sphincterotomy is an appropriate alternative for open sphincterotomy.

Keywords: Anal Fissure, Open Sphincterotomy, Closed Sphincterotomy

Comparing Debridement Wounds: A Review Study

Sajad Goudarzi [1], Davood Gheisari [1], Zahra Mansouri [1], Zahra Fatemianzade [1], Faeze Yavari [1]

1. Student's Research Committee (SRC), Nursing School, Baqiyatallah University of Medical Sciences, Tehran, Iran

Corresponding Author: Sajad Goudarzi, E-mail: sajad.goudarzi74@gmail.com

ABSTRACT

Background: Chronic wounds are often resistant to treatment and a great challenge to the development of infections. Debridement is defined as the removal of foreign material and necrotic tissue from a wound and it can also help to stimulate wound healing. However, not all methods of debridement are the same. each method has advantages and disadvantages that must be clearly understood.

Failure to use the correct method for a given wound may lead to further delays in wound healing.

Aim of this study was review and check the variety of debridement wound.

Material and Methods: This is a review study that review and exploration based on "debridement" and "wound" and "dressing "key words from "science direct" ,"pubmed", "sinhall" and " googleschoolar " databases in 10 years ago (2006-2016).also at the first, to review non-repetition study were searched "chochran library" . Finally 15 study were retrieved that base on the criteria of inclusion and exclusion criteria were chosen 8 study.

Results: We check autolytic debridement, enzymatic debridement, Mechanical debridement, surgical debridement, hydro surgical debridement and larval debridement. The, hydro surgical debridement was seen more effective than mechanical debridement. Also in autolytic debridement seen less necrosis and without pain and Bleeding. Although it will take more time than surgical debridement. Surgical debridement is the best way for necrotic tissue ulcers.

Also observed in larval therapy has many benefits such as controlling pain and the smell of the wound and promote wound healing.

The use of larval therapy reduces amputation rate and a nice alternative to treatment with antibiotics. The use of low-frequency ultrasound waves had a better result on debridement.

Conclusion: Identify the types of debridement methods and use them correctly and on time and appropriate to type of wound has a lot of great help in health process.

Also, using modern methods of debridement, quality of treatment is better and reduced duration of treatment and costs.

Keywords: Debridement, Wound, Review Study

Efficiency and Efficient Effects of LSCT in Treatment of Human Cornea Destruction

Sayed Alireza Mirsane [1], Shima Shafagh [2], Nasrin Oraei [3], Sayed Mojtaba Mirsane [3]

1. Student of Surgical Technology, School of Nursing and Midwifery, Kashan University of Medical Science, Kashan, Iran
2. General Surgeon, Medical School, Kashan University of Medical Science, Kashan, Iran
3. Education Office, Khansar Town, Esfahan, Iran

Corresponding Author: Sayed Alireza Mirsane, E-mail: alireza.seyed70@gmail.com

ABSTRACT

Background: Limbal stem cell deficiency (LSCD) can develop in traumatic, immunologic, or genetic diseases that affect the ocular surface. LSCD leads to conjunctivalization, with corneal vascularization and opacification and subsequent loss of vision thus limbal stem cell transplantation is a treatment way for this problem Our aim was evaluate of efficiency LSCT in treatment of human cornea destruction.

Methods: We did a systematic review of 15 studies identified by searching PubMed, Ovide ,Elsevier and ProQuest.Studies were about

Results: Studies showed LSCT have extraordinary usefulness in total stem cell deficiency qua autologous limbus from the opposite normal eye or homologous limbus from living related can be transplanted on to the affected eye It is worth mentioning with the latter option, systemic immunosuppression is required. Results showed patients with underlying immunologically mediated diseases, such as Stevens-Johnson syndrome, toxic epidermal necrolysis, or ocular cicatricial pemphigoid, who undergo LSCT have lower success rates further patients who undergo LSCT and with non inflammatory ocular surface diseases have good results . Analysis indicated cultures of limbal stem cells represent a source of cells for transplantation in the treatment of destruction of the human cornea.

Conclusion: Due to this review about LSCT : autologous and homologous limbus can transplant in total stem cell deficiency also cultures of limbal stem cells represent a source of cells for transplantation in the treatment of destruction of the human cornea also patients with underlying immunologically have lower success rates.

Keywords: Cornea, Limbal, Stem Cell, LSCT, Treatment

Efficiency of Autologous Chondrocyte Implantation in Microfracture Treatment

Sayed Alireza Mirsane [1], Sayed Mojtaba Mirsane [2], Nasrin Oraei [2]

1. Student of Surgical Technology, School of Nursing and Midwifery, Kashan University of Medical Science, Kashan, Iran
2. Education Office, Khansar Town, Esfahan, Iran

Corresponding Author: Sayed Alireza Mirsane, E-mail: alireza.seyed70@gmail.com

ABSTRACT

Background: Autologous chondrocyte implantation (ACI) is a biomedical treatment that repairs damages in articular cartilage. ACI provides pain relief while at the same time slowing down the progression or considerably delaying partial or total joint replacement (knee replacement) surgery. The goal of ACI is to allow people suffering from articular cartilage damage to return to their old lifestyle; regaining mobility, going back to work and even practicing sports again

Material and Methods: We did a systematic review of studies identified by searching PubMed, Ovide and Elsevier, ProQuest

Results: Studies characterized clinical benefit ACI for long-term is very good for microfracture treatment and also those showed repair tissue formed by ACI is as possible.results supported this way is invasive and simpler surgical technique and likewise this method can be useful for microfracture betterment.studies indicated that ACI has not yet been shown to give better clinical outcome than microfracture at short-term or medium-term.

Conclusion: clinical benefit ACI for long-term was superior structural outcome in treatment of microfracture with chondrocyte implantation but ACI has not yet been shown to give better clinical outcome than microfracture at short-term or medium-term also it seems fair to conclude that the repair tissue formed by ACI is as good or possible slightly better than a less invasive and simpler surgical technique 1–2 years after the surgery.

Efficiency of Amniotic Membrane Transplantation in Treatment of Human Cornea Destruction

Sayed Alireza Mirsane [1], Sayed Mojtaba Mirsane [2]

1. Student of Surgical Technology, School of Nursing and Midwifery, Kashan University of Medical Science, Kashan, Iran
2. Education Office, Khansar Town, Esfahan, Iran

Corresponding Author: Sayed Alireza Mirsane, E-mail: alireza.seyed70@gmail.com

ABSTRACT

Background: Our aim was evaluate of amniotic membrane transplantation (AMT) utility in treatment of human cornea and sclera destruction.

Material and Methods: We did a systematic review of 22 studies identified by searching PubMed, Ovide and Elsevier.

Results: Studies showed cultivated corneal epithelial transplantation by using amniotic membrane can be used for severe stem cell deficiencies and it have some of the antiinflammatory properties of the fetal tissue. Plus AMT promotes normal conjunctival epithelialization while suppressing fibrosis formation Results indicated this procedure, especially when performed with limbal autograft transplantation, appears to be effective for the treatment of chemical or thermal burns of the ocular surface. also multilayered AMT may be effective for the treatment of deep ulceration of the cornea and sclera. Analysis suggested AMT appears to be a safe method of restoring a stable corneal epithelium for limbal stem cell deficiency and can be considered as an alternative to limbal autograft or allograft.

Conclusion: We concluded: AMT is a anti-inflammatory and it can promote severe stem cell deficiencies and normal conjunctival epithelialization also AMT with limbal autograft transplantation be effective for chemical or thermal burns of the ocular surface. Multilayered AMT be useful for treatment of deep ulceration of the cornea and sclera

Tissue engineering and regenerative medicine in Ophthalmology

Advantages of amniotic membrane transplantation in remedy of human destruction of cornea

Compare of Custom Molded Offloading and Removable Plug Insoles in Offloading Rocker Bottom Shoes on Plantar Pressures Control in People with Fore Foot Diabetic Ulcer

S.Mohammad Mousavi [1], Hamed Akbari [2], Hesam Akbari [2]

1. Msc in Orthosis and Prosthesis, HSE Group, Health Research Center, Baqiyatallah University of Medical Sciences, Tehran, Iran
2. Msc in HSE, HSE Group, Health Research Center, Baqiyatallah University of Medical Sciences, Tehran, Iran

Corresponding Author: Sayed Mohammad Mousavi, E-mail: mohammadmousavi.to@gmail.com

ABSTRACT

Background: Custom molded offloading insole and removable plug insole appear to be beneficial for reduce plantar pressure in patients with fore foot diabetic foot ulcer (DFU). However, quantitative evidence of pressure reduction by means of custom molded offloading insole and removable plug insole is limited. The value of additional insole accessories, such as heel cup with medial arch additions, has not been tested. The aim of this study was to evaluate the effect of removing plugs from foam based insoles, and subsequently adding extra heel cup and medial arch support on custom molded offloading insole, on plantar pressures in DFU.

Material and Methods: In-shoe plantar pressure measurements were performed on 30 patients with fore foot DFU at a baseline condition, in order to identify the forefoot region with the highest mean peak pressure (MPP). This was defined as the region of interest (ROI) for plug removal. The primary outcome was measurement of MPP using the pedar® system in the baseline and another three insole conditions (pre-plug removal, custom offloading insole with heel cup and medial arch support, custom offloading insole with medial arch support).

Results: A significant pressure reduction in MPP (28.2%, $P<0.001$) was found after removing the insole plugs and more reduction in MPP (43.7%, $P<0.001$) with custom molded offloading insole With an medial arch support was seen, highest reduction pressure Was obtained with custom molded offloading insole With an medial arch support and heel cup in MPP (68.1%, $P<0.001$).

Conclusion: These findings suggest that best way for reduce and Distribute plantar pressure in every DFU patient is custom molded offloading insole with heel cup and medial arch support in offloading shoe with rocker bottom.

Keywords: Custom Offloading Insole, Diabetic Foot Ulcer, Plantar Pressure

Effects of Aloevera in Wounds Treatment: A Review Study

Zahra Mansouri [1], Sajad Goudarzi [1], Faeze Yavari [1], Zahra Fatemianzade [1], Zohre Vafadar [2]

1. Student's Research Committee (SRC), Nursing School, Baqiyatallah University of Medical Sciences, Tehran, Iran
2. Assistant Professor, Nursing School, Baqiyatallah University of Medical Sciences, Tehran, Iran

Corresponding Author: Zahra Mansouri, E-mail: zahramansouri82@gmail.com

ABSTRACT

Background: Aloe vera as one of the healing ways have suggested that may help accelerate the wound healing process. Aloe vera is a tropical plant belonging to the Liliaceae Family. Aloe gel operates by forming a protective coating on the affected areas, hence speeding up the healing process. This study was done for determining effectiveness aloe vera on healing of different types of wounds.

Material and Method: This systematic review study has been done in 2016 with comprehensive search in following database ISI web of science, science direct, scopus, pubmed, google scholar and some Iranian databases such as SID, Magiran, with main key words such as wounds, aloe vera and treatment, greatly English language between 2007to 2015 also with Randomized Clinical Trials methodology. From 17 retrieved articles that were evaluated with CONSORT 2015, finally six eligible articles were entered to final review.

Results: Clinical trial studies showed that aloe vera be used instead of silver sulfadiazine at least for the first few days of burns at homes or hospitals. Also aloe vera was effective on haemorrhoidectomy, cesarean wounds, surgical wounds and leishmaniasis (p value < 0.05). Studies found no statistically significant difference in pressure ulcer healing and diabetic foot ulcers. (p value > 0.05).

Conclusion: This review showed effectiveness of aloe vera on healing of different types of wounds. Although aloe vera improves some wounds healing, more studies are still needed to approve the outcomes.

Keywords: Aloe Vera, Wound, Treatment

A Review of Mechanism and Effects of Negative Pressure Closure in Wound Healing

Zahra Moghimi [1], Shiva Dehghan, Zahra Sharifi

1. Student of Pharmacy, Ahvaz University of Medical Sciences, Ahvaz, Iran

Corresponding Author: Zahra Moghimi, E-mail: mgh.zahra71@yahoo.com

ABSTRACT

Background: Wound is major cause of physical disabilities and disruption of cellular and anatomic and functional continuity of living tissue, produced by physical, chemical, electrical or microbial insults to the tissue. Several million patients suffer from nonhealing wounds in a variety of anatomical sites, costing the health system millions of dollars.

Vaccum assisted closure (VAC) therapy is a novel method of wound healing using topical negative pressure across the wound bed and containing all exudate within a sealed system. technique as a new emerging therapy for wound healing is a noninvasive system that functions by localised negative subatmospheric pressure. The efficacy of negative pressure closure (NPC) was initially described by Morykwas and Argenta in the United States, and modified in Chile by Medina.to devise a simple, cheap and effective improvised method of treating deep sternal wound infections (DSWI) by negative pressure obviating high cost of patented systems. Negative pressure wound therapy (NPWT) or vacuum-assisted closure (VAC) has played a major role as a bridge to reconstruction . Pressure used is negative pressure or sub atmospheric pressure (100-125 mm Hg) in a continuous or intermittent manner. The intermittent negative pressure is delivered at wound site through a porous dressing, which applies mechanical forces known as macro strain (physical response) and micro strain (biological response) and subsequently removes exudates by an electromechanical pump.This technique is supported largely by various clinical evidences, case series, small cohort studies, randomised trials and multicentre randomised controlled trials.

Overall,4 mechanisms of action VAC on wound healing have been proposed: (1) wound shrinkage or macrodeformation; (2) microdeformation at the foam-wound surface interface; (3) fluid removal; and (4) stabilization of the wound environment.

Material and Methods: We searched the following electronic databases with use of keywords such as negative pressure therapy and wound healing and mechanism in search engine such as sciencedirect ,pubmed ,google scholar and university valid cite to identify reports of relevant negative pressure therapy and wound healing.

Conclusion: develop use of vacuum therapy on wound healing and helped to wounds achieve faster healing, shorter hospital stays, and reduction in the overall cost.

Keywords: Negative Pressure, Wound Therapy, Vacuum Assisted Closure, Wound Healing

Poster Presentations in Basic Sciences

Physicochemical and Antimicrobial Properties of Starch-Based Film Containing Ethanolic Extract Propolis for Wound Dressing

Asghar Eskandarinia [1], Mohammad Rafienia [2], Sepehr Navid [3]

1. Department of biomaterials and tissue engineering, School of Advanced Technologies in Medicine, Isfahan University of Medical Sciences, Isfahan, Iran

2. Biosensor Research Center, Isfahan University of Medical Sciences, Isfahan. Iran

3. Department of Microbiology, School of Medicine, Isfahan University of Medical Sciences, Isfahan, Iran

Corresponding Author: Asghar Eskandarinia, E-mail: a.eskandarinia1@gmail.com

ABSTRACT

Modern dressings increase the wound-healing rate rather than just to cover it. Hydrogel dressing can protect injured skin and keep it appropriately moist to speed the healing process. Propolis is a natural product that meets the requirements as functional additive for wound dressing due to its antimicrobial activities. In this work, ethanolic extract propolis (EEP) loaded corn starch (CS-EEP) were successfully prepared using casting of CS-EEP blend solution, and characterizations with respect to their mechanical properties mechanical properties (tensile strength and elongation), scanning electron microscopy (SEM), Contact Angle (CA) and Attenuated Total Reflectance-Fourier Transform Infrared (ATR-FTIR) Spectroscopy as well as antimicrobial capacities were performed. The results showed that tensile strength films decreased by the presence of EEP was but elongation increase about 10% when compared to control films possibly because of EEP plasticizer effect. When 1% EEP was used, changes in contact angle (CA) properties were detected by a slightly hydrophobic character at films CA. The antibacterial activity of composite corn starch film is increased with increasing amount of propolis. The interaction between the CS-EEP network film was studied using ATR-FTIR. The EEP exhibited antimicrobial activity against Staphylococcus aureus and Escherichia coli even at low EPE concentrations (1%) mainly due to its phenolic compounds. Therefore, with the antimicrobial activity, ethanolic propolis extract loaded corn starch film will be a potential candidate for wound dressing and skin tissue engineering.

Keywords: Corn Starch, Propolis, Wound Dressing, Antimicrobial

Pivotal Role of PRGF in Regeneration and Healing

Zahra Agha Mohamadi [1], Fahimeh Sadat Tabatabaei [1]

1. Department of Dental Biomaterials, School of Dentistry, Shahid Beheshti University of Medical Sciences, Tehran, Iran

Corresponding Author: Zahra Agha Mohamadi, E-mail: drfatemi@gmail.com

ABSTRACT

Nowadays, Medicine is rapidly moving towards the development of non-invasive treatments and personalized strategies to achieve a more predictable and optimal tissue regeneration. Several procedures are performed in an attempt to regenerate lost tissues and enhance the healing process.

A combination of stem cells, scaffolds and growth factors which are used for tissue engineering, offer favorable results for regeneration of injured or lost tissues.

Growth factors – a class of biologically polypeptides – provide a new paradigm to understand regenerative medicine, and hence play an important role in the healing process; and when are adjacent to other moderators, particularly PRGF - which is obtained from the patient's own blood, considered as an autologous plasma preparation enriched in proteins and prepares the environment for the growth factors, cytokines and adhesive proteins – accelerate and enhance tissue repair and thus, the ultimate regeneration. Moreover, PRGF has shown to be capable of reducing the intensity and the duration of postsurgical pain, declining the discomfort of the patient, accelerating the wound re-epithelialization, decreasing the healing time and controlling Edema and bleeding.

This presentation investigates the effects of plasma rich in growth factors (PRGF) on the healing of wounds and regeneration of tissues in various branches of medicine and dentistry.

Porous Poly Ethet Ether Ketone (PEEK) Biomaterial in Critical Bone Defects

Parisa Amdjadi [1,2], Hanieh Nojehdehian [1,3]

1. Department of Dental Biomaterials, School of Dentistry, Shahid Beheshti University of Medical Sciences, Tehran, Iran

2. Department of Developmental Sciences, Marquette University, School of Dentistry, Milwaukee, WI, USA

3. Department of Tissue Engineering, School of Advanced Technologies in Medicine, Shahid Beheshti University of Medical Sciences, Tehran, Iran

Corresponding Author: Parisa Amdjadi, E-mail: drfatemi@gmail.com

ABSTRACT

As a new Biomaterial, polyether-ether-ketone (PEEK) has gained widespread acceptance as a high-strength polymer used in hard and soft tissue reconstructions, with favorable imaging compatibility and stiffness that closely matches bone. The ultimate goal of most medical implants is to restore impaired biological function and achieve functional integration with the body. Several porous polymers and other tissue engineered scaffolds have made advances in this regard, however similar solutions in high load-bearing orthopedic environments remain elusive in clinically adopted biomaterials.

The challenge for porous peek material is the engineering of a material with pores that are sufficiently large for bone ingrowth, yet also able to retain desirable structural properties. Porous PEEK implants exhibited increased osseointegration and fixation by improving the migration and proliferation of various cell types to enhance vascular and bone tissue ingrowth.

The findings showed that typical porosity of 51%, Wall Thickness of 312μm, and mean pore size of 369μm demonstrated improvements in connective density near that of trabecular bone, however low compressive strength (15MPa) would preclude the use of wholly porous material in critical size load bearing application.

Limiting porosity to PEEK's surface could promote osseointegration and maintain bulk mechanical properties. A porous surface layer could retain implant strength, provide an optimum external structure for bone ingrowth, and avoid tissue necrosis at the center of large fully porous implants in cases of limited vascular and nutrient supply. Therefore solid- porous PEEK ,will provide both the structural integrity in load bearing application, along with the ability for osseoconductivity and improved implant fixation.

Triple Antibiotic Paste and Pulp Regeneration Protocol

Ardavan Parhizkar [1], Saeed Asgary [2], Hanieh Nojeh-Dehian [1]

1. Department of Dental BioMaterials, School of Dentistry, Shahid Beheshti University of Medical Sciences, Tehran, Iran
2. Research Centre for Dental Studies & Sciences, School of Dentistry, Shahid Beheshti University of Medical Sciences, Tehran, Iran

Corresponding Author: Ardavan Parhizkar, E-mail: drfatemi@gmail.com

ABSTRACT

With the contemporary schools of thought in Medicine and Medical - related fields, in which replacement methods are being gradually substituted by regenerative approaches, new concepts in Dentistry such as "Vital Pulp Therapy" and "Endodontic Regeneration Protocol (ERP)" with promising results and outcomes have recently been taken into account. One of the most premiere requisites in the aforementioned modern strategies is the eradication and removal of the existing microorganisms through the disinfection and possible sterilization of the pulp chamber and radicular system; which appears to be accomplished by the proper use of antibiotics in the "Root Canal Area"; particularly with the application of a paste - a combination of Ciprofloxacin, Metronidazole and Minocycline - when ERP is specially sought; since the said formula seems to effectively invade the intracanal pathogenic microbiota, remove them from the area and next to the needed instrumentation, prepare a matrix for further healing of the pulpal tissue. Research, investigation and studies have revealed the significance of TAP, which has found its place as an inseparable component of such treatments, resulting in tissue regeneration and subsequent healing of the pulp.

Histological Study of Skin Wound Healing with Fish Swim Bladder Matrix

Sajedeh Jalali [1], Masoud Fereidoni, Naser Mahdavi Shahri, Roya Lari

1. MS Student, Department of Biology, Faculty of Science, Ferdowsi University, Mashhad, Iran

Corresponding Author: Sajedeh Jalali, E-mail: sajedeh.jalaly93@gmail.com

ABSTRACT

Today, because of the variety of wounds, a wide range of wound dressings produce with different objectives. One of the wound dressing, that skin tissue engineering scientists were concerned, is the use of animal tissue models as biological dressing for wound healing. Since the collagen scaffold has many applications in skin tissue engineering, for the first time in this experiment, rutilus fish swimming bladder matrix (FSBM) was used as a model of collagen-containing tissue for wound healing in rats. In this study, first the FSBM was decellularized by using ionic materials. Then 6 randomly selected rats were wounded on the back with 2 wounds 4 mm length. Wounds were divided into two groups: the first group as control and the second group using FSBM wound dressing. Wound dressings were changed daily. On days 3, 5 and 7 of the start of the experiment, tissue samples were taken from ulcers' sections and wound assessment indicator were evaluated by specific staining criteria. Wound histology image analysis showed that the FSBM increased migration of skin fibroblast cells and the process of forming the epidermis layer and angiogenesis and finally improved wound healing in compare with the control. It is assumed that FSBM is an appropriate model for wound healing and can be used as a new clinical biological dressing.

Keywords: Biological Dressing, Fish Swim Bladder, Rat, Wound, Restoration Skin

Wound Healing by MG53 Protein - Mediated Cell Membrane Repair

Maryam Jahanshiri Moghadam [1], Reza Hosseinzadeh [1], Khatereh Khorsandi [1], Hoda Keshmiri [1], Seyed Mostafa Fatemi [1]

1. Medical Laser Research Center, ACECR, Tehran, Iran

Corresponding Author: Maryam Jahanshiri Moghadam, E-mail: ma.jahanshiri@yahoo.com

ABSTRACT

Cell membrane repair is an important aspect of physiology and disruption of this process can result in pathophysiology in a number of different tissues repair including wound healing, chronic ulcer and scarring. Recent studies identified a novel tripartite motif family protein, MG53, as an essential component of the cell membrane repair machinery. Mitsugumin 53 (MG53), a muscle-specific TRIM family protein, is vital element of the cell membrane repair. This human gene product can regulate wound healing and may control scarring in people recovering from severe injuries and damages to certain internal organs. The protein, MG53, release throughout the bloodstream and helps the body fix skin, heart, and other organs injuries without causing scars. Application of mentioned protein, as new biotechnological bioprodut, can assist the open wounds healing and decrease recovery time after surgery and reduce the spread of infections.

Keywords: Wound Healing, MG53, Cell Membrane, Repair

Wharton's Jelly Mesenchymal Stem Cells for Burn Patients

Mostafa Dahmardehei [1], Sona Zare [2,3]

1. Burn Research Center, Shahid Motahari Hospital, Iran University of Medical Sciences (IUMS), Tehran, Iran

2. Skin and Stem Cell Research Center, Tehran University of Medical Sciences, Department of Biology, Faculty of Basic Sciences, Islamic Azad University, Hamedan Branch, Hamedan, Iran

Corresponding Author: Mostafa Dahmardehei, E-mail: sonazarebio@gmail.com

ABSTRACT

When burn victims need a skin graft they typically have to grow skin on other parts of their bodies, a process that can take weeks. A new technique uses stem cells derived from the umbilical cord to generate new skin much more quickly. Not only can the stem cells develop artificial skin more quickly than regular normal skin growth, but the skin can also be stored so it is ready right when it is needed. Tens of thousands of grafts are performed each year for burn victims, cosmetic surgery patients, and for people with large wounds having difficulty healing. Traditionally, this involves taking a large patch of skin (typically from the thigh) and removing the dermis and epidermis to transplant elsewhere on the body.

The artificial skin requires the use of Wharton's jelly mesenchymal stem cells. As the name implies, Wharton's jelly is a gelatinous tissue in the umbilical cord that contains uncommitted mesenchymal stem cells (MSC). The MSC is then combined with agarose (a polysaccharide polymer) and fibrin (the fibrous protein that aids in blood clotting). This yielded two results: skin and the mucosal lining of the mouth. The researchers are very pleased to have found two new uses for the stem cells of Wharton's jelly, which have not previously been researched for epithelial applications.

Once the epithelial tissues have been created, researchers can store it in tissue banks. If someone is brought into the hospital following a devastating burn or accident, the tissue is ready to graft immediately; not in a few weeks. However, the stem-cell skin is not able to fully differentiate in vitro. After the graft, it has complete cell-cell junctions and will develop all of the necessary layers of normal epithelial tissue.

The MSCs are taken from the umbilical cord after the baby has been born, which poses no risk to either the mother or the child. This method is relatively inexpensive and has been shown to be more efficient than stem cells derived from bone marrow.

Keywords: Wharton's Jelly Mesenchymal Stem Cells, Burns, Skin

Full Thickness Skin Tissue Regeneration Using Sheep Small Intestine Sub Mucosal and Bone Marrow Mesenchyme Stem Cell

Morteza Rashtbar [1], Jamshid Hadjati, Esmaeil Sadroddiny, Jafar Ai, Issa Jahanzad, Mahmoud Azami

1. Tissue Engineering, Tehran University of Medical Sciences, Tehran, Iran

Corresponding Author: Morteza Rashtbar, E-mail: mrashtbar@yahoo.com

ABSTRACT

Skin loss presents an ongoing challenge in reconstructive surgery. Approaches to achieve tension free closure of these defects include autologous skin flaps, alloplastic and xenogenic implants. However, these approaches have disadvantages, including donor site morbidity, infections and immunological rejections. Acellular tissue scaffolds have recently been suggested as a novel therapy for these defects. And also it is well known the role of bone marrow mesenchymal stem cell (BM-MSC) in regeneration and repair of skin defects. In this study, sheep acellular small intestinal matrix (SSIS) was prepared using 0.01% Sodium dodecyl sulfate (SDS). Healing potential of SSIS and BM-MSC+SSIS was compared in full-thickness skin wounds in rat. Twelve clinically healthy rat of mail sex were randomly divided into three equal groups. Under anesthesia, four full thickness skin wounds (20 mm × 20 mm each) were produced on the dorsum of each rat. Wounds in control (I) were left open whereas in SSIS (II) and BM-MSC+SSIS (III) they were repaired during 21 days. Planimetry, wound contracture, immunological and histological observations were carried out to evaluate healing process. Significantly ($P < 0.05$) greater wound contraction was observed in SSIS (II) and BM-MSC+SSIS (III) as compared to control (I). Histologically, improved epithelialization, neovascularization, fibroplasia and best arranged collagen fibers were observed in BM-MSC+SSIS (III) as early as on post-implantation day 21. These findings indicate that sheep SSIS alone and with seeded cells (MSCs) have excellent potential for skin regeneration.

Keywords: Skin, Bone Marrow Mesenchymal Stem, Small Intestinal Submucosa, Wound Closure

Application of Stem Cells Condition Medium in Wound Healing

Sona Zare [1,2], Faeze Jahangiri [1], Mohammad Ali Nilforoushzadeh [1,3], Rahim Ahmadi [2], Mostafa Dahmardehei [4], Somayeh Hejazi [1]

1. Skin and Stem Cell Research Center, Tehran University of Medical sciences, Tehran, Iran
2. Department of Biology, Faculty of Basic Sciences, Islamic Azad University, Hamedan Branch, Hamedan, Iran
3. Skin and Leschmaniosis Research Center, Esfahan University of Medical Sciences, Esfahan, Iran
4. Burn Research Center, Shahid Motahari Hospital, Iran University of Medical sciences, Tehran, Iran

Corresponding Author: Sona Zare, E-mail: sonazarebio@gmail.com

ABSTRACT

Stem cell biology has gained remarkable interest in recent years, driven by the hope of finding cures for numerous diseases including skin wound healing through transplantation medicine. Initially upon transplantation, these cells home to and differentiate within the injured tissue into specialized cells. Contrariwise, it now appears that only a small percentage of transplanted cells integrate and survive in host tissues. Thus, the foremost mechanism by which stem cells participate in tissue repair seems to be related to their trophic factors. Indeed, stem cells provide the microenvironment with a wide range of growth factors, cytokines and chemokines which can broadly defined as the stem cells secretome. In in vitro condition, these molecules can be traced from the conditioned medium or spent media harvested from cultured cells. Conditioned medium now serves as a new treatment modality in regenerative medicine and has shown a successful outcome in some diseases. With the emergence of this approach, we described the possibility of using stem cells conditioned medium as a novel and promising alternative to skin wound healing treatment. Numerous pre-clinical data have shown the possibility and efficacy of this treatment.

Keywords: Stem Cell, Condition Medium, Wound Healing

Allogeneic Fibroblasts in Cell Therapy of Wound Healing

Sona Zare [1,2], Faeze Jahangiri [1], Mohammad Ali Nilforoushzadeh [1,3], Hossein Vazini [4], Mostafa Dahmardehei [5], Somayeh Hejazi [1]

1. Skin and Stem Cell Research Center, Tehran University of Medical Sciences, Tehran, Iran
2. Department of Biology, Faculty of Basic Sciences, Islamic Azad University, Hamedan Branch, Hamedan, Iran
3. Skin and Leschmaniosis Research Center, Esfahan University of Medical Sciences, Esfahan, Iran
5. Department of Nursing, Faculty of Basic Sciences, Hamedan Branch, Islamic Azad University, Hamedan, Iran
4. Burn Research Center, Shahid Motahari Hospital, Iran University of Medical sciences, Tehran, Iran

Corresponding Author: Sona Zare, E-mail: sonazarebio@gmail.com

ABSTRACT

Fibroblasts used in tissue engineering may be allogeneic or autologous. In contrast to allogeneic cells, autologous fibroblasts carry no risk of rejection or risk of cross-infection. However, there is often a delay in culturing autologous cells in order to obtain sufficient cell numbers, whereas allogeneic cells are cryopreserved and therefore readily available. For permanent engraftment, autologous fibroblasts are necessary. However, allogeneic fibroblasts have been used as a biological dressing or for preconditioning of the wound bed prior to application of a permanent graft, especially when wounds are very large. In addition, using autologous fibroblasts in dermal substitutes has led to better restoration of dermal skin and minimal scar formation compared with allogeneic dermal substitutes.

There have also been a number of studies investigating the immunological impact of allogeneic cells on the recipient. Apligraf is a living skin substitute composed of allogeneic keratinocytes and allogeneic fibroblasts and its application in acute human wounds showed that these were not detectable beyond 6 weeks. It has therefore been suggested that allogeneic cells are eventually silently replaced by host cells. In addition, large trials involving grafting of allogeneic skin equivalents onto venous ulcers did not reveal evidence of rejection clinically or immunologically in the patients. There was no demonstration of induction of antibodies specific for human leukocyte class I antigens expressed on allogeneic cells and no proliferation of T cells in patients after exposure to the antigens. One of the reasons for the perceived lack of acute rejection in immunocompetent hosts is that dermal fibroblasts lack major histocompatibility complex class

II antigens necessary for antigen presentation. It has also been proposed that as keratinocytes and fibroblasts are cultured in vitro, the antigen-presenting cells such as Langerhans cells, are gradually lost following serial passages and are therefore no longer present in cultured skin substitutes; hence, they do not stimulate an acute rejection process.

Keywords: Allogeneic, Fibroblast, Cell Therapy, Wound Healing

Cross - linked Gelatin / Poly (Glycerol Sebacate) (PGS) Membrane as a Potential Scaffold for Skin Tissue Engineering and Drug Delivery

Parisa Shirazaki [1], Anooshe Zargar Kharazi [1], Jaleh Varshosaz [2]

1. Department of Advanced Medical Technology, Biomaterials Group, Isfahan University of Medical Sciences, Isfahan, Iran
2. Department of Pharmaceutics, School of Pharmacy and Isfahan Pharmaceutical Science Research Center, Isfahan University of Medical Science, Isfahan, Iran

Corresponding Author: Parisa Shirazaki, E-mail: shirazaki.p@gmail.com

ABSTRACT

Background: When the skin as a physical barrier is damaged, pathogens have a direct route to infiltrate the body, possibly resulting in infection. therefore our task is primarily treatment the wounds to prevent the infections and stimulate the skin to repair is in second grade. Nowadays biodegradable materials are gaining extensive attention in the field of soft tissue engineering.

Gelatin is a biodegradable and non-antigenic polymer, which provide hemostasis and facilitates cell adhesion and proliferation during healing process. Poly (glycerol sebacate)(PGS) is a synthesis polyester which is biocompatible, biodegradable, inexpensive and generally has soft and flexible mechanical properties.In this study we fabricated the gelatin / PGS blend scaffold with Ciprofloxacin as an antibiotics drug by electrospinning method for preventions the infections and skin tissue engineering.

Material and Methods: sebasic acid and glycerol combined in 1:1 ratio at 120°C under nitrogen gas and high vaccum for 24 hours to prepare the PGS synthesis polymer.(3) after synthesis process gelatin added to PGS in 3:1 ratio and %25 (w/v) of polymers solved in %80 (v/v) acetic acid in 37~ 40°C stirring for 3 hours. at the end 0.025 gr of ciprofloxacin added to the solution.

For the electrospinning process, a 5 mL syringe was used to inject the polymer solution by flow rate of 0.5 mL/h and 12cm distance between the needle and collector of device, while the voltage was kept at 18 kV.(4)

finally scaffolds crosslinked by N,N-(3-dimethylaminopropyl) - N0 - ethyl - carbodiimide hydrochloride (EDC) and N-hydroxysuccinimide (NHS) in 2.5:1 ratio in %90 ethanol which is less cytotoxic compared to glutaraldehyde The surface morphologies, fiber diameter, prosity and inter connectivity of the

electrospun scaffold, before and after crosslinking process, were characterized using scanning electron microscopy (SEM) and Fourier-transform infrared spectroscopy (FTIR) being used to verify the chemical composition of the scaffold and study the specific interactions between gelatin and PGS. For antiobiotic test we done the disk diffusion method and for cell viability of the scaffold we handle colorimetric 3-(4,5-dimethylthiazol-2-yl)-2,5-di¬phenyltetrazolium bromide (MTT) assay.

All the resulte about the rate of drug releasing obtaned by UV-Visible spectrophotometry.

Results: the fiber size after crosslinking increase from 178±60 to 872±90 nm which might be due to swelling of the fibers during the crosslinking process. Prosity of crosslinked membrane increased from 80.49±0.32 to 87.92±0.05 and three prosity layer of scaffold showed the interconnectivity before and after crosslinking process which determined by MATLAB software.

FTIR analysis showed the Characteristic peaks of gelatin, PGS and ciprofloxacin without any additional peaks of infections before and after crosslinking process. The antimicrobials test demonstrated different degrees of antimicrobial activity against both negative and positive bacterial species evaluated and cell viability assay in 24-well culture plate showed the reduction of MTT. The spectrophotometry results showed the %50 percent of drug releasing in first 24 h after soaking in PBS(buffer phosphate salin) and %70 in first 72 h.

Conclusion: Overall, our results showed that the cross-linked gelatin/PGS scaffold could be a promising biodegradation scaffold for skin tissue engineering and drug delivery.

Keywords: Gelatin, Poly Glycerol sebacate, Ciprofloxacin, Skin Tissue Engineering, Drug Delivery

Promotion of Wound Healing by Alcoholic Extract of Stevia's Bitter Fraction in Experimental Rats

Fariba Najafi [1], Akram Zangeneh [1,2], Mohammad Mahdi Zangeneh [1,2], Nassim Amiri [1,3]

1. Department of Dermatology, Kermanshah University of Medical Science, Kermanshah, Iran

2. Microbiology Section, Department of Pathobiology & Basic Sciences, Veterinary Faculty, Razi University, Kermanshah, Iran

3. Microbiology Section, Department of Pathobiology & Basic Sciences, Veterinary Faculty, Islamic Azad University, Tehran, Iran

Corresponding Author: Akram Zangeneh, E-mail: akramzangeneh@yahoo.com

ABSTRACT

Background: Ethnomedicinal plants have been identified and prescribed all over human history. Plants make many chemical compounds that are for biological functions, including wound healing, and defence against fungi and bacteria. The medicinal plants are used widely because of their effectiveness, fewer side effects and relatively low cost. Stevia is a medicinally useful plant with many remedial properties. The purpose of this study was determination of healing activity of alcoholic extract of Stevia's bitter fraction (SBF) on wound-healing of skin in rats. To our knowledge, this is the first study on healing properties of the plant.

Material and Methods: A full-thickness cutaneous defect (2×2cm) was induced on the back of 20 rats. The animals were randomly divided into four equal groups, treated with Tetracycline 3% (Group 1), basal cream (Group 2), cream of alcoholic extract of SBF 10% (Group 3) and untreated=control (Group 4). Five animals of each group were euthanized at 30 day post-injury (DPI) and number of total cells and blood vessels (magnification ×200) of skin dermis were counted and evaluated through histopathological analyses.

Results: The number of total cells, blood vessels, fibrocytes, fibroblasts, and ratio fibrocytes/fibroblasts of skin dermis in 30 DPI as follows respectively Group 1: 562.50±36.31b, 9.20±2.20c. Group 2: 902.70±122.30a, 12.20±3.35b. Group 3: 479.70±87.16c, 3.20±1.68d. Group 4: 936.00±64.06a, 13.50±2.73a.

Conclusion: As they are seen number of total cells and blood vessels reduced greatly in Group 3 to Group 1, 2, and 4 in 30 DPI. In conclusion, these results showed that application of alcoholic extract of SBF on wounds induces considerable accelerated wound-healing and it may be offered for treating different types of wounds in human beings.

Keywords: Stevia's Bitter Fraction, Alcoholic Extract, Wound Healing Activity

Evaluation of Wound Healing Activity Following Aqueous Extract of Citrus Limon Seeds in Experimental Rats

Fariba Najafi [1], Akram Zangeneh [1,2], Mohammad Mahdi Zangeneh [1,2], Nassim Amiri [1,3]

1. Department of Dermatology, Kermanshah University of Medical Science, Kermanshah, Iran
2. Microbiology Section, Department of Pathobiology & Basic Sciences, Veterinary Faculty, Razi University, Kermanshah, Iran
3. Microbiology Section, Department of Pathobiology & Basic Sciences, Veterinary Faculty, Islamic Azad University, Tehran, Iran

Corresponding Author: Mohammad Mahdi Zangeneh, E-mail: m.mahdizangeneh@gmail.com

ABSTRACT

Background: Ethnomedicinal plants have been identified and prescribed all over human history. Plants make many chemical compounds that are for biological functions, including wound healing, and defence against fungi and bacteria. The medicinal plants are used widely because of their effectiveness, fewer side effects and relatively low cost. Citrus limon is a medicinally useful fruit with many remedial properties. The purpose of this study was determination of healing activity of aqueous extract of Citrus limon seeds (CLS) on wound-healing of skin in rats. To our knowledge, this is the first study on healing properties of the plant.

Material and Methods: A full-thickness cutaneous defect (2×2cm) was induced on the back of 20 rats. The animals were randomly divided into four equal groups, treated with Tetracycline 3% (Group 1), basal cream (Group 2), cream of aqueous extract of CLS 10% (Group 3) and untreated=control (Group 4). Five animals of each group were euthanized at 10 day post-injury (DPI) and number of lymphocytes, macrophages, fibrocytes, fibroblasts, and ratio fibrocytes/fibroblasts (magnification ×200) of skin dermis were counted and evaluated through histopathological analyses.

Results: The number of lymphocytes, macrophages, fibrocytes, fibroblasts, and ratio fibrocytes/fibroblasts of skin dermis in 10 DPI as follows respectively: Group 1: 7.30±3.30a, 1.60±1.26b, 2.70±1.56a, 21.10±3.66b, 0.12±0.07a. Group 2: 1.00±1.15c, 0.30±0.67c, 1.20±1.61c, 49.70±9.32a, 0.01±0.03c. Group 3: 0.20±0.42d, 0.00±0.00d, 0.90±1.10c, 50.50±6.24a, 0.02±0.02c. Group 4: 3.50±2.17b, 2.20±1.81a, 1.90±1.59bc, 27.70±6.12b, 0.06±0.05b.

Conclusion: As they are seen number of lymphocytes and macrophages reduced and number of fibroblasts increased greatly in Group 3 to Group 1, 2, and 4 in 10 DPI. In the present study we demonstrate that aqueous extract of CLS is efficient in wound-healing and that it cures conditions at the wound site to elevate better healing.

Keywords: Citrus Limon Seeds, Aqueous Extract, Wound Healing Potential

Medicinal Plants: Evaluation of Wound Healing Activity Aqueous Extract of Quercus in Rats Wound Model

Fariba Najafi [1], Akram Zangeneh [1,2], Mohammad Mahdi Zangeneh [1,2], Nassim Amiri [1,3]

1. Department of Dermatology, Kermanshah University of Medical Science, Kermanshah, Iran
2. Microbiology Section, Department of Pathobiology & Basic Sciences, Veterinary Faculty, Razi University, Kermanshah, Iran
3. Microbiology Section, Department of Pathobiology & Basic Sciences, Veterinary Faculty, Islamic Azad University, Tehran, Iran

Corresponding Author: Mohammad Mahdi Zangeneh, E-mail: m.mahdizangeneh@gmail.com

ABSTRACT

Background: Wound healing is an integrated cellular and biochemical procedure of restoring indigenous structure functions of vicious tissue. Healing is a normal phenomenon by which body itself dominate the damaged to the tissue but the rate of healing is very gradual and chance of microbial infection is vast. Recovery in healing procedure can be perform either shorten the time required for healing or to minimize the undesired consequences. The medicinal plants are used widely because of their effectiveness, fewer side effects and relatively low cost. Quercus is a medicinally useful plant with many remedial properties. The purpose of this study was determination of healing activity of aqueous extract of Quercus on wound-healing of skin in rats. To our knowledge, this is the first study on healing properties of the plant.

Material and Methods: A full-thickness cutaneous defect (2×2cm) was induced on the back of 20 rats. The animals were randomly divided into four equal groups, treated with Tetracycline 3% (Group 1), basal cream (Group 2), cream of aqueous extract of Quercus 10% (Group 3) and untreated=control (Group 4). Five animals of each group were euthanized at 30 day post-injury (DPI) and number of total cells, blood vessels (magnification ×200), fibrocytes, fibroblasts, and ratio fibrocytes/fibroblasts (magnification ×200) of skin dermis were counted and evaluated through histopathological analyses.

Results: The number of total cells, blood vessels, fibrocytes, fibroblasts, and ratio fibrocytes/ fibroblasts of skin dermis in 30 DPI as follows respectively: Group 1: 562.50±36.31b, 9.20±2.20c, 4.44±2.92b, 12.44±2.92c, 0.38±0.26a. Group 2: 902.70±122.30a, 12.20±3.35b, 1.70±2.71d, 46.50±10.02a, 0.04±0.06d. Group 3: 621.00±73.88b, 6.90±4.20d, 12.70±10.84a, 44.20±17.63a,

0.31±0.33b. Group 4: 936.00±64.06a, 13.50±2.73a, 3.30±2.21c, 31.40±4.96b, 0.09±0.06c.

Conclusion: As they are seen number of total cells and blood vessels reduced and number of fibrocytes, fibroblasts, and ratio fibrocytes/fibroblasts increased greatly in Group 3 to Group 4 in 30 DPI. In the present study we demonstrate that aqueous extract of Quercus is efficient in wound healing and that it cures conditions at the wound site to elevate better healing.

Keywords: Quercus, Aqueous Extract, Wound Healing Activity

Wound Healing Potential of Aqueous Extract of Citrus Limon Seeds in Experimental Rats

Fariba Najafi [1], Mohammad Mahdi Zangeneh [1,2], Hossein Amiri [1,3], Akram Zangeneh [1,2]

1. Department of Dermatology, Kermanshah University of Medical Science, Kermanshah, Iran

2. Microbiology Section, Department of Pathobiology & Basic Sciences, Veterinary Faculty, Razi University, Kermanshah, Iran

3. Department of Clinical Sciences, Veterinary Faculty, Islamic Azad University, Kurdistan, Iran

Corresponding Author: Mohammad Mahdi Zangeneh, E-mail: m.mahdizangeneh@gmail.com

ABSTRACT

Background: Ethnomedicinal plants have been identified and prescribed all over human history. Plants make many chemical compounds that are for biological functions, including wound healing, and defence against fungi and bacteria. The medicinal plants are used widely because of their effectiveness, fewer side effects and relatively low cost. Citrus limon is a medicinally useful fruit with many remedial properties. The purpose of this study was determination of healing activity of aqueous extract of Citrus limon seeds (CLS) on wound-healing of skin in rats. To our knowledge, this is the first study on healing properties of the plant.

Material and Methods: A full-thickness cutaneous defect (2×2cm) was induced on the back of 20 rats. The animals were randomly divided into four equal groups, treated with Tetracycline 3% (Group 1), basal cream (Group 2), cream of aqueous extract of CLS 10% (Group 3) and untreated=control (Group 4). Five animals of each group were euthanized at 30 day post-injury (DPI) and number of total cells, blood vessels (magnification ×200), fibrocytes, fibroblasts, and ratio fibrocytes/fibroblasts (magnification ×200) of skin dermis were counted and evaluated through histopathological analyses.

Results: The number of total cells, blood vessels, fibrocytes, fibroblasts, and ratio fibrocytes/fibroblasts of skin dermis in 30 DPI as follows respectively: Group 1: 562.50±36.31b, 9.20±2.20c, 4.44±2.92a, 12.44±2.92c, 0.38±0.26a. Group 2: 902.70±122.30a, 12.20±3.35b, 1.70±2.71d, 46.50±10.02a, 0.04±0.06d. Group 3: 360.00±76.72c, 2.50±2.17d, 4.40±3.43a, 30.80±10.92b, 0.22±0.28b. Group 4: 936.00±64.06a, 13.50±2.73a, 3.30±2.21c, 31.40±4.96b, 0.09±0.06c.

Conclusion: As they are seen number of total cells and blood vessels reduced and number of fibrocytes and ratio fibrocytes/fibroblasts increased greatly in Group 3 to Group 4 in 30 DPI. In conclusion, these results showed that application of aqueous extract of CLS on wounds induces considerable accelerated wound-healing and it may be offered for treating different types of wounds in human beings.

Keywords: Citrus Limon Seeds, Aqueous Extract, Wound Healing Potential

Application of Bacterial Nanocellulose as Active Wound Dressing

Somayeh Alimohammadi

Medical Nanotechnology, Faculty of Medicine, Shahid Beheshti University of Medical Sciences, Tehran, Iran

Corresponding Author: Somayeh Alimohammadi, E-mail: somayeh.alimohamadi@gmail.com

ABSTRACT

Large area skin defects are the main concern in clinical treatment. Development of new skin substitutes and modern wound dressings and skin tissue scaffolds are required. Bacterial nanocellulose is an interesting material for using as a wound dressing since it provides moist environment to a wound resulting in a better wound healing .Moreover, its mechanical properties and porous structure are considered to be appropriate for biomedical applications. Porous structure of bacterial cellulose mimics the extracellular matrix of the skin. Also, it can also hold the incorporated drugs and other modifiers, which can modulate its properties improving the bacterial cellulose antimicrobial activity which is rather poor for native BC. In the recent literature, one can find the results of studies on BC modification to improve its antimicrobial property. There are literature data about incorporation of copper or silver to form copper/silver–bacterial cellulose nanocomposites (synthesis carried out in situ), forming the silver chloride–BC membranes ,soaking the dry cellulose in benzalkonium chloride, blending the BC with chitosan , which have proven antimicrobial activity against microorganisms. In other research the antiseptic octenidine drug was incorporated in bacterial nanocellulose with the intension to develop a ready-to-use system for wound treatment. They were stable for up to 6 months storage without losing their favorable physicochemical and biological characteristics. Their finding suggest that the octenidine loaded BC exhibit a tremendous potential as wound dressing with controlled drug delivery. Bacterial cellulose reveals high hydrophilic properties and never dries, which is a desired property, because it was proven that wounds heal better and faster when the wound is being constantly moisturized. The biotechnological process of obtaining bacterial cellulose should also be taken into consideration in further studies for it to be more efficient. It can happen due to new sources of carbon for BC biosynthesis. This characteristic of bacterial cellulose-based materials indicates that it may successfully serve as a wound dressing and skin tissue scaffold.

Keywords: Bacterial Cellulose, Antimicrobial Activity, Drug Delivery, Wound Dressing, Skin Tissue Scaffold

Applications and Indications of Wound Healing Bioconstructs

Fariba Moheby Chamkhorami [1,2], Akram Alizadeh [1]

1. Cellular and Molecular Research Center, Shahrekord University of Medical Sciences, Shahrekord, Iran
2. Faculty of Biological Sciences, Shahid Beheshti University, Tehran, Iran

Corresponding Author: Fariba Mohebychamkhorami, E-mail: faribamoheby64@yahoo.com

ABSTRACT

Background: In the 1980s, tissue engineered skin substitutes emerged because of the critical need for early coverage of extensive burn injuries in patients with insufficient sources of autologous skin grafting and they have recently become a suitable and highly practical alternative of it. These products are based on existing technologies for rapid and safe coverage of extensive burns wounds. In this review we studied all tissue engineered skin constructs in order to wound repairs.These skin substitutes can regulates proteins and cytokines in order to stimulating rapid vascularization, fibroblast migration, and keratinocyte proliferation to accelerated healing of wound beds without conventional drawbacks of autologous skin grafts including need for donor site, risk of infection and sepsis, mortality and morbidity from scarring and also they reduce the total number of surgical procedures.

Material and Methods: We have done a thorough literature search in the medical databases and collected the data and research results of recent years in this regard.

Results: Wound healing products includes epidermal, dermal, and combined, full-thickness skin replacements that have clinical and experimental evidence of efficacy in wound healing.

Reasonable and medically necessary type of these products based on Ucare policy that are commercially available are Apligraf®, Dermagraft®, Epifix®, GraftJacket ®, Hyalomatrix®, Integra™, Oasis®, Theraskin® that three of them have FDA approval under PMA (class III) regulation with high regulatory burden including Apligraf®, Dermagraft®, Integra® are used for interactive wound and burn dressing as long-term or a temporary synthetic skin substitute. Apligraf® is human keratinocytes, fibroblasts, and bovine or porcine collagen derived Composite matrices, Dermagraft® are composed from allogenic matrices derived from human neonatal fibroblasts and Integra and Oasis® are acellular matrices derived from porcine or bovine collagen. GraftJacket®

and TheraSkin® are composed from Human skin allografts derived from donated human cadaver tissue and Epifix® and Hyalomatrix® are derived from cultured epithelial autografts.

Conclusion: In spite of the required improvements, skin bioconstructs are a very promising strategy for treating clinical burns and injuries, as well as other advanced therapy medicinal products (ATMPs) but further studies is needed in order to promoting this approach to streamline the manufacturing process.

Keywords: Wound Healing Products, Skin Substitutes, FDA Status, Skin Bioconstructs

Comparative Effects of Stimulated Mesenchymal Stem Cell with Compound of LPS and Poly-I-c with Stimulated Mesenchymal Stem Cell with Poly-I-c in burn Wound Healing

Leyla Soleymani [1], Rahim Hobbenaghi [2], Kiavash Hushmandi [3]

1. Department of Biology, Faculty of Science, Urmia University, Urmia, Iran
2. Department of Pathobiology, Faculty of Veterinary Medicine, Urmia University, Urmia, Iran
3. Department of Veterinary Science, Shahid Chamran University, Ahvaze, Iran

Corresponding Author: Leyla Soleymani, E-mail: lsoleimany@yahoo.com

ABSTRACT

Background: The therapeutic management of severe burns remains a challenging topic. Results derived from several studies indicate a benefit for tissue regeneration by Stimulated mesenchymal stem cells (SMSCs) with LPS or Poly-I-C cells. The aim of this study was to investigated the effects of SMSCs with compound LPS and Poly-I-C at the same time on burn healing and compared with SMSCs just with Poly-I-C.

Material and Methods: In this study mesenchymal stem cells were activated with compound of LPS (10ngr/lit) and Poly-I-C (5µg/lit) at the same time and with just Poly-I-C (5µg/lit). 18 healthy 7-8 week old mic randomly divided into two groups and burn was created with metal heated rod on shaved back of all mics for 9 second. SMSCs with compound LPS and Poly-I-C were injected subcutaneously around of burn area (106 cell in 400 µl) in one group and SMSCs with just Poly-I-C in the other group. Prepared section at 7, 14 and 21 days after induction of burn injury, were stained with hematoxylin eosin and masons trichrome to study histopathological effect of SMSCs with compound of LPS and Poly-I-C in comparison with SMSCs with only Poly-I-C in burn wound healing.

Results: In this study some parameters of wound healing such as formation of granulation tissue (Respectively on day 14 $p \leq .013$), fibroblast number (Respectively on day 14 $p \leq .034$) speed of contraction of wound and collagen deposition were evaluated. Result demonstrate that treat group with SMSCs with compound LPS and Poly-I-C at the same time has no acceptable regenerative effect on

wound healing in comparison SMSCs with only LPS.

Conclusion: These data suggest that separate Agonist (Poly-I-C or LPS) to activate cells more effective than compound it (Poly-I-C and LPS) in burn wound healing.

Keywords: Burn, Healing, Stimulated Bone marrow-derived, Mesenchymal Stem Cell, Poly-I-C, LPS.

Comparative Effects of Stimulated Mesenchymal Stem Cell with LPS and Poly-I-c and Stimulated Mesenchymal Stem Cell with LPS in Burn Wound Healing

Leyla Soleymani [1], Kiavash Hushmandi [2], Mostafa Vosough khelejani [3]

1. Department of Biology, Faculty of Science, Urmia University, Urmia, Iran
2. Department of Veterinary Science, Shahid Chamran University, Ahvaze, Iran
3. Department of Veterinary Medicine, Tabriz Branch, Islamic Azad University, Tabriz, Iran

Corresponding Author: Leyla Soleymani, E-mail: lsoleimany@yahoo.com

ABSTRACT

Background: Burn injuries result in loss of its protective function that leading to a high risk of infection. Results derived from several studies indicate that Bone Marrow mesenchymal stem cells (BMSc) may contribute to tissue regeneration whether through producing variety of bioactive growth factors and/or by differentiation into mesoderm lineage useful for accelerate burn healing. As well as several study demonstrate that stimulated Bone Marrow mesenchymal stem cells (SBMSc) with LPS can gain an inflammatory phenotype. Several studies show that wound healing process. Several study demonstrate the positive effect of SBMSc with LPS on accelerate wound healing through more collagen deposition and neoangigenesis. The aim of this study was to investigated the effects of stimulated Bone marrow mesenchymal stem cells with compound of LPS and Poly-I-C at the same time and just with LPS on burn healing.

Material and Methods: This study was experimental and was performed in Urmia University. Eighty healthy 7-8 week old mics randomly divided into two groups. All of eighty mics was burned on the shaved back with heated rod for 9 second. BMSc were separated and stimiulated with LPS (10ngr/lit) and Poly-I-C (5µg/lit) at the same time in first burned group and SBMSc just with LPS in second burned group. Respectively in first and second burned groups of animal, subcutaneously injection of SBMSc with compound LPS and Poly-I-C (106 cell in 400 µl) and SBMSc just with LPS (106 cell in 400 µl) was performed around of burn area. 7, 14 and 21 days after induction of burn injury, biopsies were taken from burn wound and then the section were prepared. Subsequently the prepared section were stained with hematoxylin eosin and masons trichrome to explore

histopathological effect of SBMSc with compound LPS and Poly-I-C in comparison with stimulated cell just with LPS in burn wound healing.

Results: In this study some parameters of wound healing such as formation of granulation tissue (Respectively on day 7 $p \leq .000$) and collagen deposition were evaluated. As well as reduction in thickness of granulation tissue, number of fibroblast and blood vessel in last days of healing versus early days as main factors to measurement speed of burn wound healing were calculated. Result demonstrate that treat group with SBMSc with compound of LPS and Poly-I-C at the same time has no acceptable regenerative effect on wound healing in comparison stimulated mesenchymal stem cells with just LPS.

Conclusion: our study suggest that separated level of LPS or Poly-I-C to stimulate mesenchymal stem cells offers more regenerative effect than the compound of LPS and Poly-I-C at same time in accelerate of burn wound healing.

Keywords: Burn, Healing, Stimulated Bone Marrow-Derived Mesenchymal, Stem Cell, LPS, Poly-I-C

Comparative Effects of Stimulated Mesenchymal Stem Cell with LPS and Poly-I-c with Unstimulated Mesenchymal Stem Cell in Burn Wound Healing

Leyla Soleymani [1], Rahim Hobbenaghi [2], Samad Zare [1], Nowruz Delirezh [3], Kiavash Hushmandi [4]

1. Department of Biology, Faculty of Science, Urmia University, Urmia, Iran
2. Department of Pathobiology, Faculty of Veterinary Medicine, Urmia University, Urmia, Iran.
3. Department of Microbiology, Faculty of Veterinary Medicine, Urmia University, Urmia, Iran
4. Department of Veterinary Science, Shahid Chamran University, Ahvaze, Iran.

Corresponding Author: Leyla Soleymani, E-mail: lsoleimany@yahoo.com

ABSTRACT

Background: Although Burn injury are common, treatment for disabling condition remain limited and severe burns provides irreparable effects on the affected patient. Evidence demonstrate that Bone marrow mesenchymal stem cells (BMSc) are useful for accelerate burn healing. As well as several study show that stimulated bone marrow mesenchymal stem cells (SBMSc) with LPS or Poly-I-C has more therapeutic potential than unstimulated cell to accelerate tissue wound healing. The aim of this study was to investigated the effects of SBMSc with compound LPS and Poly-I-C at the same time on burn healing and compared with unstimulated BMSc group.

Material and Methods: In an experimental study that was performed in Urmia University, 18 male mic with an approximately 7-8 week old with thired-degree skin burn that induced with a metal rods on shaved back of mics were divided into 2 separate groups. As well as BMSc were separated and 106 cells were prepared for unstimulated BMSc treatment group and 106 cell were stimiulated with compound LPS (10ngr/lit) and Poly-I-C (5µg/lit) at the same time for SBMSc with LPS and Poly-I-C treatment group. unstimulated and Stimulated mesenchymal stem cell with LPS and Poly-I-C were injected subcutaneously around the burn area in two groups. At 7, 14 and 21 days after induction of burn injury, biopsies were taken from burn wound area and then the section were prepared. Subsequently the prepared section were stained with hematoxylin eosin and masons trichrome to explore histopathological change avoke by administration of SBMSc cells with LPS and Poly-I-C in comparison with unstimulated BMSc group.

Results: result showed that formation of granulation tissue as a most important factor of healing

at the early days (Respectively on day 7 $p \leq .005$) significantly was more in unstimulated BMSc treatment group. As well as speed of burn wound healing and collagen deposition demonstrate that treat with stimulated Bone marrow mesenchymal stem cells with LPS and Poly-I-C at the same time has no acceptable therapeutic effect on accelerate of healing in comparison unstimulated mesenchymal stem cells group.

Conclusion: our study suggest that subcutaneously injection SBMSc with compound of LPS and Poly-I-c at the same time in comparison to unstimulated BMSc in burn area not only don't has positive effect on wound healing but also decreased it.

Keywords: Burn, Healing, Stimulated Bone Marrow Derived, Mesenchymal Stem Cell, LBS

Roles of Stem Cells in the Repair of Skin Lesions Caused by the Bacterium Staphylococcus Aureus

Farideh Alah Gahi

Department of Biology, Islamic Azad University, Damghan Branch, Damghan, Iran

Corresponding Author: Farideh Alah Gahi, E-mail: faridehalahgahi@gmail.com

ABSTRACT

now a day's usage of stem cell is main factor for repairing in the medical field; researchers have special consideration on this aspect.

Stem cells are able for self-renewing and differentiate to different types of cell lines. This is an attractive subject in the field in cell biology and cell therapy. The main causes of infected wounds are from bacterium called staphylococcus aureus. The wound is yellowish color. Impetigo sores caused by the presence of these bacteria.

Researchers are trying to repair wounds affected by this bacteria. So in this study they are trying to evaluate role of stem cell in curing of skin lesions with presence of staphylococcus aureus bacterium.

Background: staphylococcus aureus is gram positive and selective anaerobic bacteria. Stem cells are able for self-renewing and differentiate to different types of cell lines. They can repair damaged tissue especially in skin lesions which is affected by staphylococcus aureus bacterium.

Discussion and result; as we know staphylococcus aureus can provide skin lesion. Stem cell biology is introducing new way of treatment for skin lesion caused by these bacteria (transferring of skin fibroblast cell to affected area).

Conclusion: Skin fibroblast cell can be used for repairing of wounds affected by staphylococcus aureus.

Keyword: Stem Cell, Skin Lesions, Staphylococcus Aureus

Effects of Alcoholic Extract of Grape Seed (Vitis Vinifera) on Wound Healing Diabetic Male Wistar Rats; A Histomorphometric Study

Farideh Alah Gahi

Department of Biology, Damghan Branch, Islamic Azad University, Damghan, Iran

Corresponding Author: Farideh Alah Gahi, E-mail: faridehalahgahi@gmail.com

ABSTRACT

Background: Diabetes is a metabolic disorder characterized by hyperglycemia resulting from defects in insulin secretion and impaired pancreatic function appears. With regard to the medicinal properties of black grape seed, this study examined the effects on skin Histomorphometric wound healing changes in diabetic Wistar rats was performed.

Material and Methods: In this study 48 male Wistar rats into four groups (negative control, positive control, The first experimental ,The second experimental) were divided. Groups tested in the injured of 3 cm length wounded were created on the left of vertebral column. The wound healing was evaluated microscopically and macroscopy.

Results: Compared with normal wound healing in diabetic groups were later and Wound healing in experimental groups treated with Vitis Vinifera more quickly than the control and first experimental groups, respectively.

Conclusions: In this study the skin ointment Vitis Vinifera accelerate the wound healing is normal and diabetic samples.

Keywords: Wound, Grape Seed, Rat, Diabetes

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Abstract
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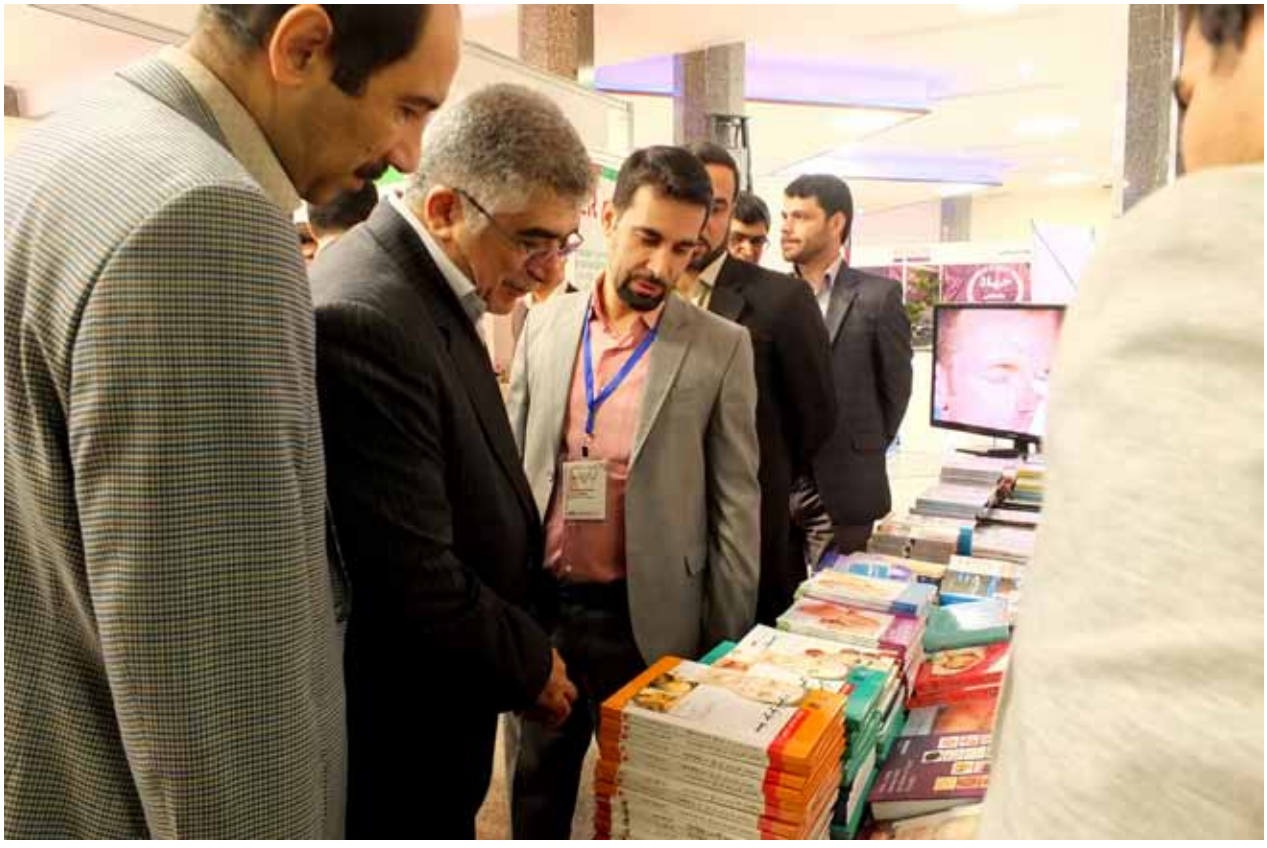

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