

Clinical Practice Guidelines for Intervention and Care of People with Pressure Ulcers or risk of suffering

Authors

Renata Virginia González Consuegra RN, M.Sc, Ph.D

Gustavo David Matiz Vera Nursing Student

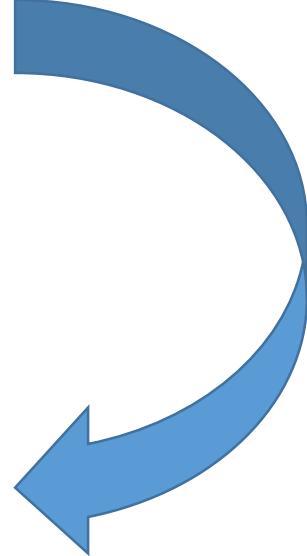
Lizeth Xiomara Guzmán Carrillo RN

Julián Daniel Hernández Martínez Nursing Student

School of Nursing
Universidad Nacional de Colombia

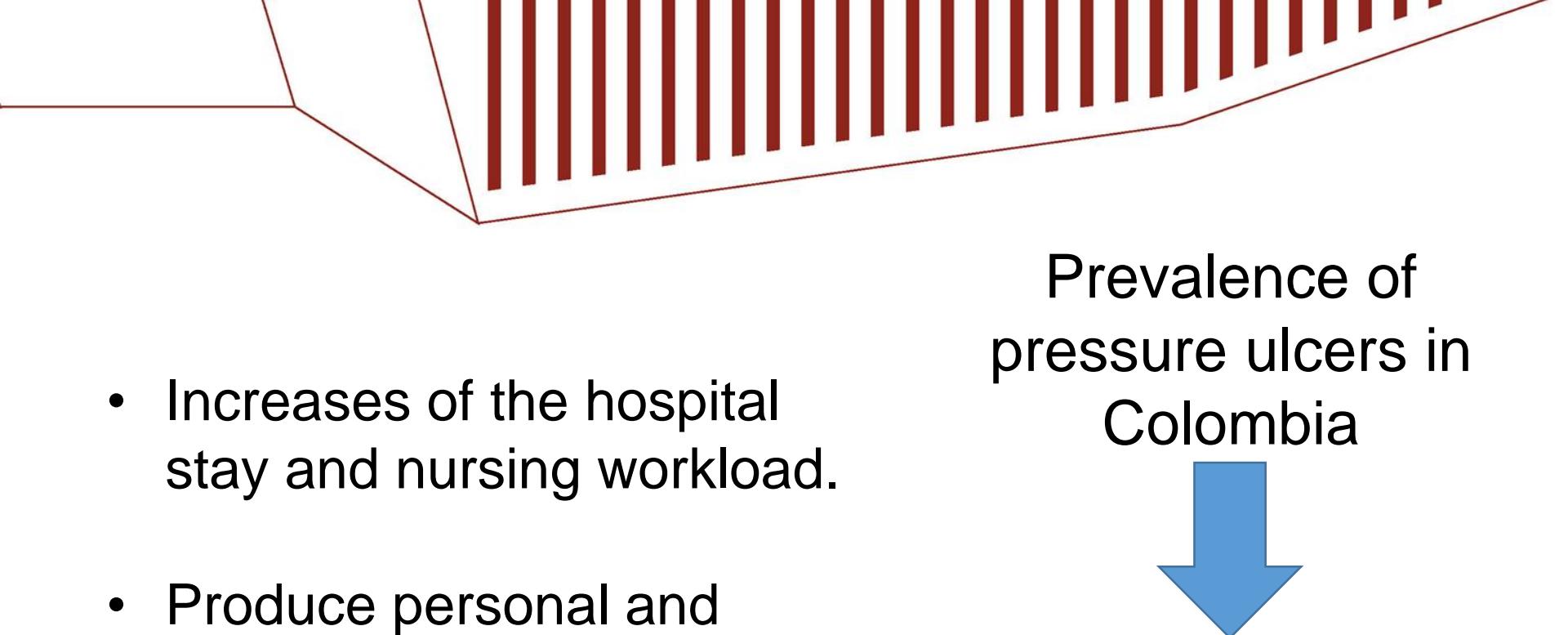


Pressure ulcers are an important public health problem



Generating a negative impact on health

- Affecting all assistance levels.
- Elderly.
- Increasing healthcare costs.



Prevalence of pressure ulcers in Colombia

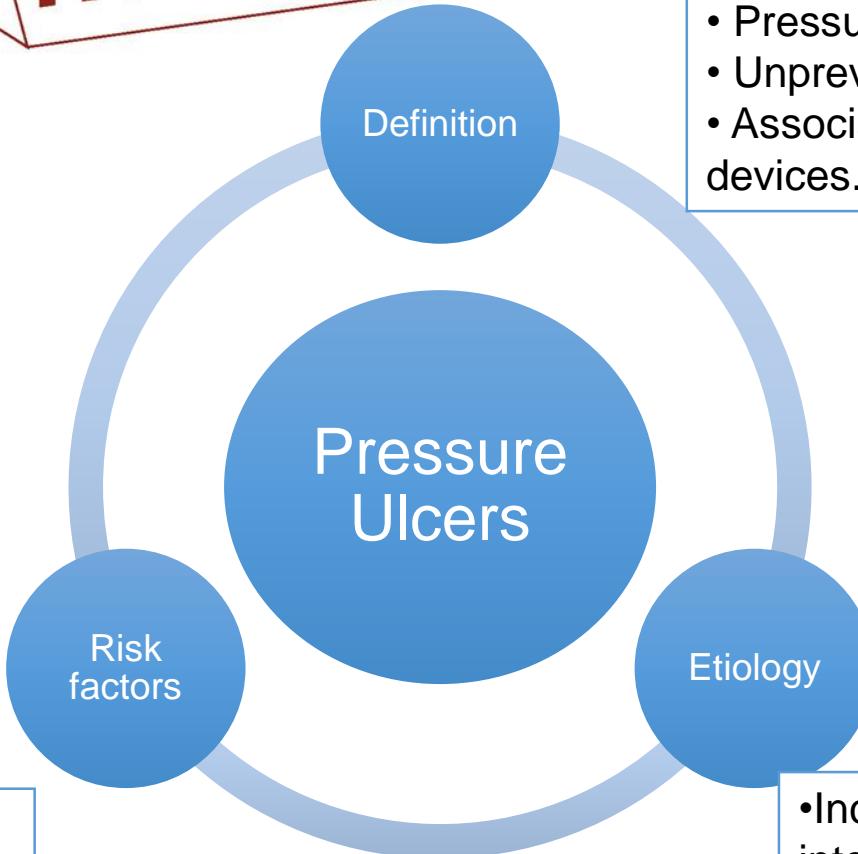
- Increases of the hospital stay and nursing workload.
- Produce personal and family suffering.
- Impairs the quality of life related to health.

2,213%*

Pressure
ulcers are
preventable in
98% of cases*

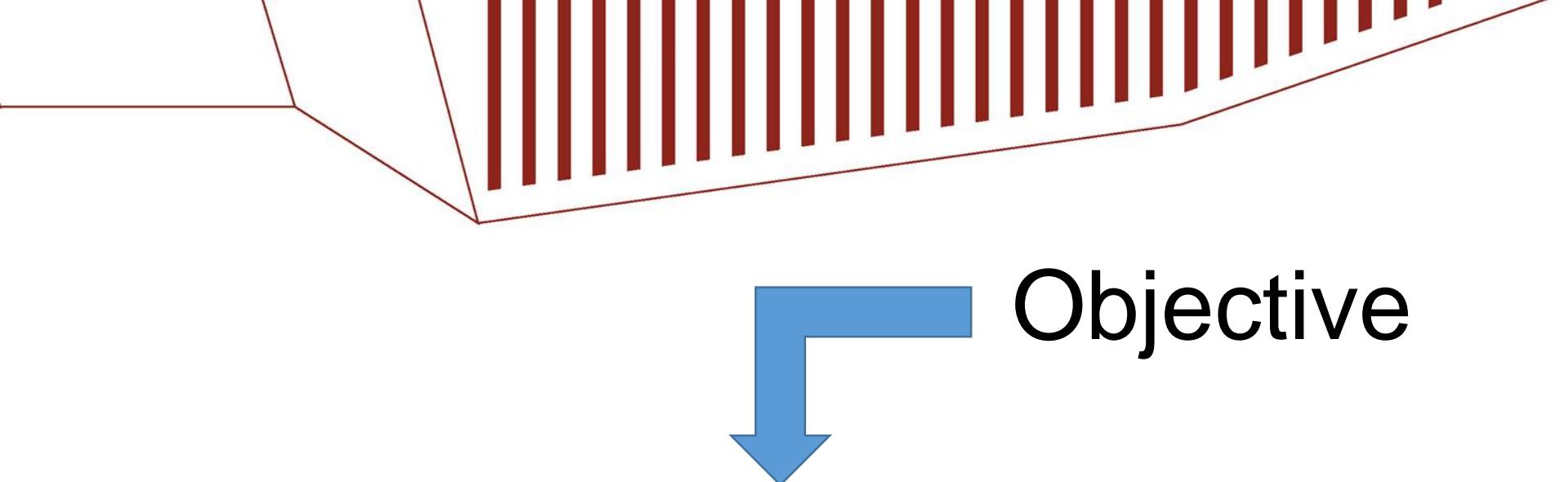
- Intrinsic: Poor nutritional status, chronic illness, immobility, sensory impairment, age.

- Extrinsic: pressure, friction, shear, moisture, long periods in bed.

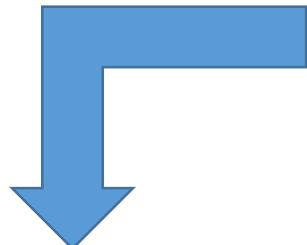


- Pressure, friction, shear.
- Unpreventable.
- Associated with medical devices.

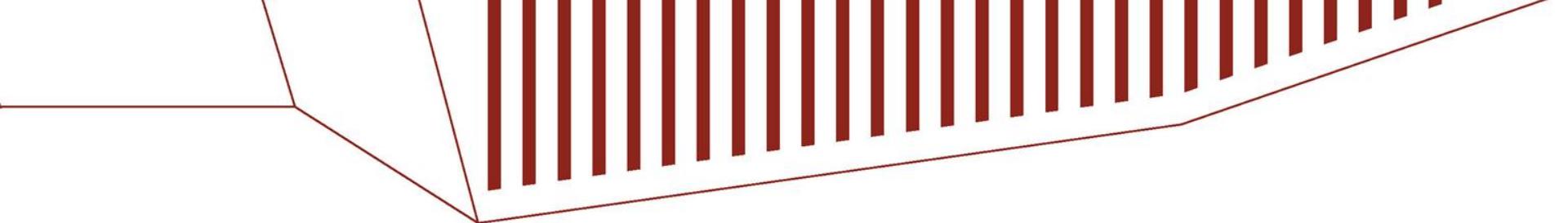
- Increasing pressure interface.
 - Pressure, friction, shear.
 - Bony prominences
 - Pressure higher than 17 mmHg.
 - Ischemia and necrosis.



Objective



Elaborate a clinical practice guideline based on scientific evidence to guide decision making health team, in terms of prevention, diagnosis, treatment and recovery of people with pressure ulcers or present the risk of suffering.



Systematic Review: 2009-2014

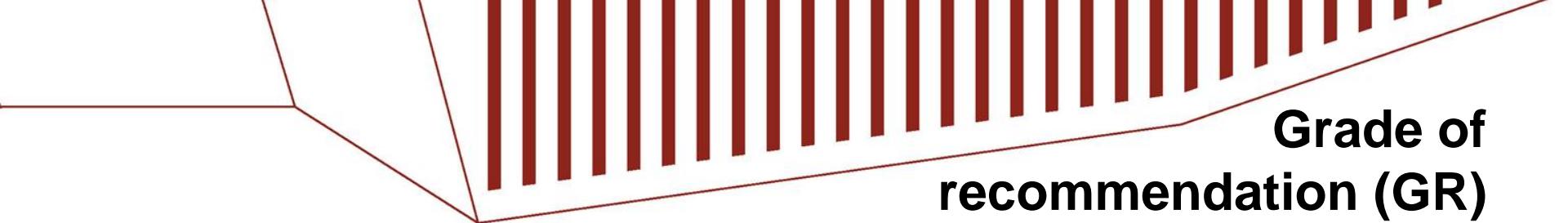
Databases:
**MEDLINE, EMBASE,
Scielo, ScienceDirect,
Scopus and CUIDEN**

MeSH: Pressure Ulcer, Nursing
Care, prevention & control,
Diagnosis, Treatment, Practice
Guideline.

Snow Ball
methodology

Assessment
tool GRADE

Articles: prevention,
diagnosis, treatment
and recovery

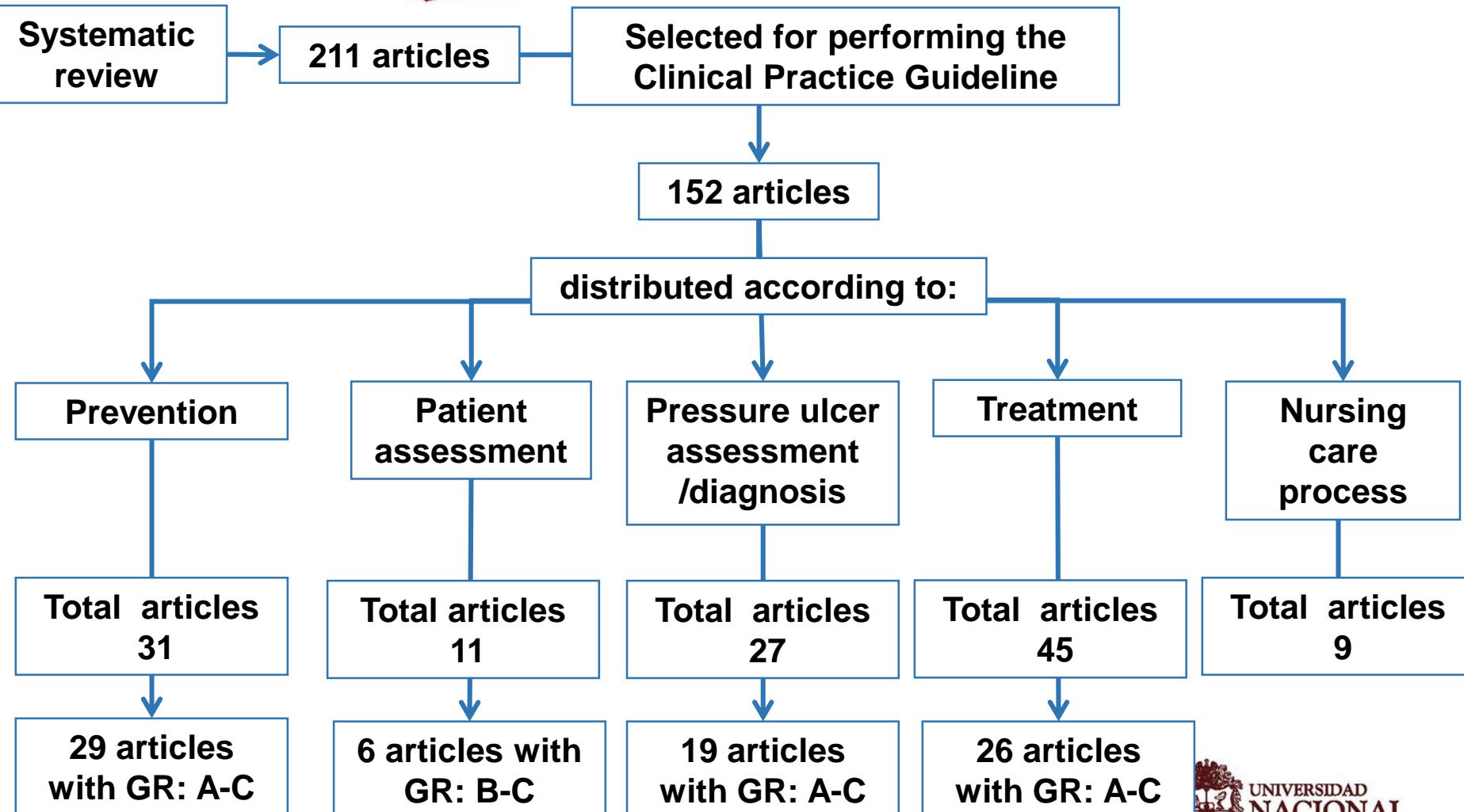


Grade of recommendation (GR)

Scientific Evidence	Level of Evidence	GR
Meta-análisis de ensayos clínicos controlados y aleatorizado.	Ia	A
Meta-analysis of randomized controlled clinical trials.	Ib	
At least one prospective controlled study, well designed without randomize.	II a	B
At least one quasi-experimental study, well designed.	II b	
Non-experimental descriptive studies, well designed as comparative studies, correlation or case-control.	III	
Documents or expert opinions and/or clinical experiences of authorities of prestige.	IV	C

Types of evidence	GR
There is good evidence based research to support the recommendation.	A
There is moderate evidence based research to support the recommendation.	B
The recommendation is based on expert opinion or consensus panel.	C

Results



Results

Interventions for Prevention

- Risk - Assessing for pressure ulcer
 - Applying a EVRUPP (Braden, Norton, Norton modificada, Waterlow, Emina) (GR: B).
- Skin protection
 - Applying hyperoxygenated fatty acids, cleansing the skin without use hot water and excessive friction and not perform massage. (GR: B).
 - Use neutral pH soap and protective barriers (GR: C).

Results

Interventions for Prevention

- Request nutricional support for patients with high risk according to EVRUPP or MUST (GR: A-B).
- Control excess moisture (GR: B).
- Position changes depending the health condition (GR: A-C).

Results

Interventions for Prevention

- Protection of bony prominences (GR: B).
 - Using foam or hydrocellular dressings (GR: A).
 - Implementation of SEMP (GR: A-B).

Results

Patient assessment

- Consider the previous pathology and patient's age (GR: C).
- Patient in intensive care unit (ICU)
 - Valorar a los pacientes con APACHE II (GR: B).

Results

Patient assessment

- Assessing health-related quality of life (HRQoL)
 - Using instrument PUQOL, MDS-HSI, SF-36 y EQ-5D (GR: B).
- Pain assessment
 - Using visual analog scale or facial expression (GR: C).
- Perform the registration (GR: C).

Results

Pressure ulcer assessment and diagnosis

- Categorize, measure and define the type of existing tissue of pressure ulcer (GR: B).
- Assess the pressure ulcers category I with convex surface (GR: B).



http://www.puclas.ugent.be/international_elearning.html

Results

Pressure ulcer assessment and diagnosis

- Bidimensional measurement of pressure ulcers
 - Linear measurements, images, tracings and photographs with measurements in centimeters after debridement (GR: B-C).
- Three dimensional or volume measurement of pressure ulcers
 - Calculating the depth or topographic measurement software (GR: B-C).
- Gold standar: Comparison between experts (GR: B).

Results

Pressure ulcer assessment and diagnosis

- Evaluate the healing process
 - Document the location, surface, infection, exudate, tunneling and skin perilesional (GR: C).
- Assessment healing
 - Use scale PUSH (GR: B).
- Assessment nutritional condition:
 - Use the MNA or MUST instrument (GR: A-B).

Results

Interventions for Treatment

- Autolytic debridement
 - Technologies based on moist environment treatment (hydrocolloid and hydrogel) (GR: A).
 - Applying honey (GR: C).
- Enzymatic debridement
 - Collagenase derived from *Clostridium histolyticum* (GR: B).
 - Papain (GR: C).

Results

Interventions for Treatment

- Biological debridement (Larval)
 - Protection of the surrounding skin with hydrocolloid barrier (GR: B).
- Surgical debridement
 - Making post-debridement cultures (GR: C).
- Infection control
 - Honey, silver dressings, low-pressure pulsatile lavage in UPP III-IV (GR: B).

Results

Interventions for Treatment

- Clean and debride if local infection (GR: A).
- Pressure Relief
 - Dry flotation mattresses and air cells cushions with alternating pressure (GR: C).

Results

Interventions for Treatment

- Stimulation of the healing process
 - Hydrocolloid dressings, collagen foam, honey, electrical stimulation, polarized light and natural substances, silver dressings, low-pressure pulsatile lavage in pressure ulcer III-IV (GR: A-B).

Results

Interventions for Treatment

- Nutritional Management
 - Collagen protein supplements, arginine, antioxidants, micronutrients and higher intake 30 kcal/kg/day (GR: A-B).
- Surgical Treatment
 - After debridement (GR: C).
 - Musculocutaneous and fasciocutaneous flap for pressure ulcer III-IV (GR: B-C).

Conclusions

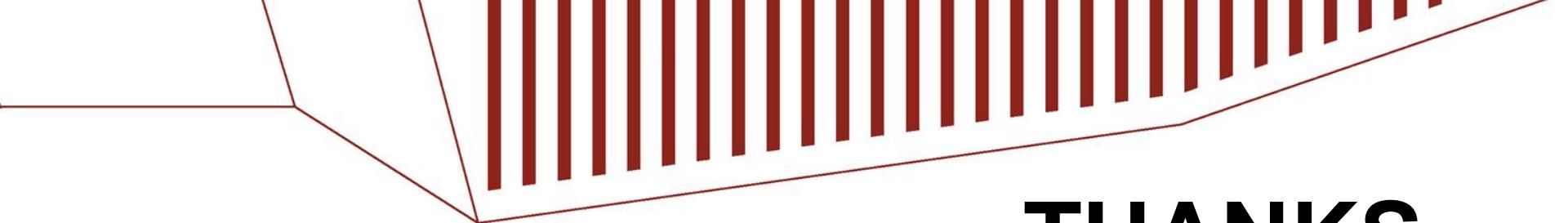
- Quality care to the person with pressure ulcer and/or at risk of suffering, is the responsibility of the entire team of health led by nursing and must be based on scientific evidence.
- Interventions should be directed to the patient as a whole being considering its physical, psychological and social dimensions, and not only around the injury.

Conclusions

- Nursing plays an essential role in the care and this work contributes to the visibility of the discipline and encourages research on relevant issues in Public Health such as the pressure ulcer.
- Further research to generate high scientific evidence to qualify the care is required for it to be comprehensive and quality for people with pressure ulcer or at risk of suffering.

Conclusions

- Methodological rigor is important to formulate recommendations for clinical practice, considering criteria for assessing the quality of scientific evidence on which they are supported.
- The CPG seeks to unify criteria and guidance to health professionals in terms of interventions for prevention, diagnosis, treatment and nursing care plan.



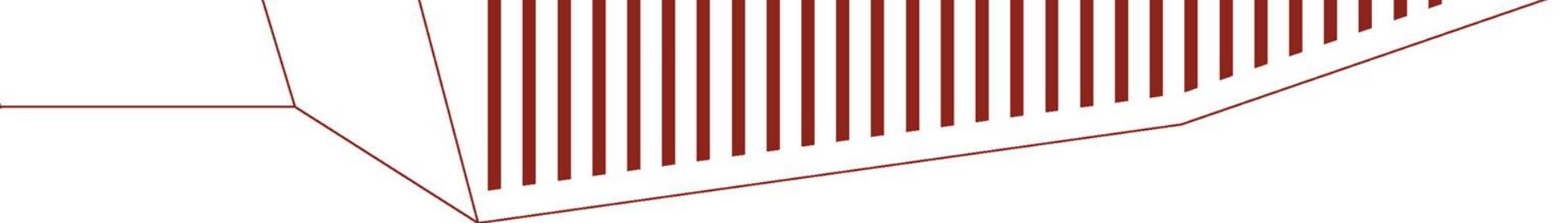
THANKS



References

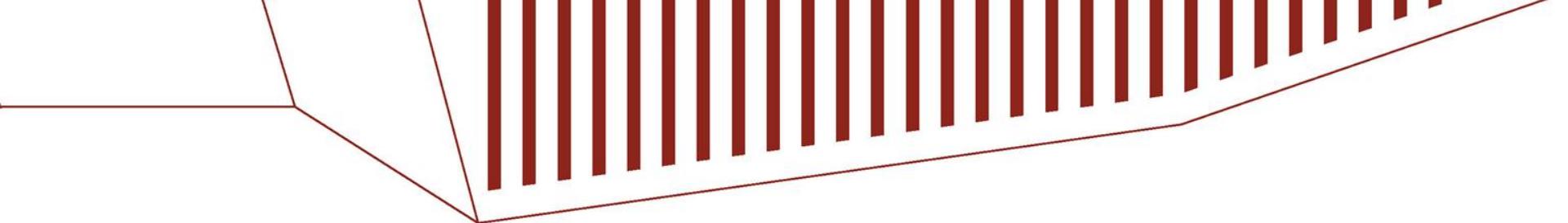
1. Verdú J. Epidemiología, prevención y tratamiento de las úlceras por presión. Universidad de Alicante 2005;8-11.
2. García-Fernández FP, Soldevilla-Agreda JJ, Verdú J, Pancorbo-Hidalgo PL. A New Theoretical Model for the Development of Pressure Ulcers and Other Dependence-Related Lesions. *J Nurs Scholarsh.* 2014;46(1):28-38. doi: 10.1111/jnu.12051.
3. González-Consuegra RV, Cardona-Mazo DM, Murcia-Trujillo PA, Matiz-Vera GD. Prevalencia de Úlceras por Presión en Colombia: Informe preliminar. *Rev Fac Med.* 2014;62(3):369-377.
4. Mancilla-García M, Zepeda-Arias F. Importancia de las guías de práctica clínica en enfermería. *Rev Enferm Inst Mex Seguro Soc* 2012;20(1):1-3.
5. Ministerio de la Protección Social. República de Colombia. Lineamientos para la implementación de la Política de Seguridad del Paciente. 2008.
6. González-Consuegra RV, Matiz-Vera GD, Hernández-Martínez JD, Guzmán-Carrillo LX. Plan de atención integral de enfermería para el cuidado de personas con úlceras por presión. *Rev. Fac. Med.* 2015;63(1):69-80. Spanish. doi: <http://dx.doi.org/10.15446/revfacmed.v63n1.46595>.
7. Alepuz Vidal L, Benítez Martínez J, Casaña Granell J, Imbernón JC, Fornes Pujalte B, García Molina P, Giménez Tébar JL, López Casanova P, Márquez Mendoza M, Montal Navarro MA, Sanchis Sánchez E, Verdú Soriano J, Vergara Hernández C. Guía de Práctica Clínica para el Cuidado de Personas con Úlceras por Presión o Riesgo de Padecerlas. Generalitat Valenciana. Conselleria de Sanitat. 2012:271 p.
8. Moura T, Moura M, Caetano J. O uso da escala de Braden e fotografias na avaliação do risco para úlceras por pressão. *Rev Esc Enferm USP.* 2012;46(4):858-864.
9. Källman U, Suserud B-O. Knowledge, attitudes and practice among nursing staff concerning pressure ulcer prevention and treatment - a survey in a Swedish healthcare setting. *Scand J Caring Sci.* 2009;23:334-341.
10. Quesada Ramos C, García Díez R. Evaluación del grado de conocimiento de las recomendaciones para la prevención y el cuidado de úlceras por presión en Unidades Críticas. *Enferm Intensiva.* 2008;19(1):23-34.
11. Hernández Ortiz JA. Prevención y cuidados en úlceras por presión. ¿Dónde estamos? *Gerokomos.* 2009;20(3):132-140.
12. Marques Rodrigues A, Verdú Soriano J. Fatores influenciadores dos cuidados de enfermagem domiciliários na prevenção de úlceras por pressão. *Revista de Enfermagem Referência.* 2011;3(5):55-63.
13. Cox J. Predictors of Pressure Ulcers in Adult Critical Care Patients. *Am J Crit Care.* 2011;20:364-375.
14. Dickinson S, Tschannen D. Can the Use of an Early Mobility Program Reduce the Incidence of Pressure Ulcers in a Surgical Critical Care Unit? *Crit Care Nurs Q.* 2013;36(1):127-140.
15. Young J, Ernsting M, Kehoe A, Holmes K. Results of a Clinician-Led Evidence-Based Task Force Initiative Relating to Pressure Ulcer Risk Assessment and Prevention. *J Wound Ostomy Continence Nurs.* 2010;37(5):495-503.
16. Bååth C, Idvall E, Gunningber L, Hommel A. Pressure-reducing interventions among persons with pressure ulcers: results from the first three national pressure ulcer prevalence surveys in Sweden. *Journal of Evaluation in Clinical Practice.* 2013;1-8.
17. Anguera Saperas L, Colodrero Díaz E, García Grau N, Mateo Zapata E, Roca Biosca A, Velasco Guillén MC. La educación como pieza clave en la prevención y buena evolución de las úlceras por presión. *Enferm Intensiva.* 2009;20(1):19-26.
18. Lago M. Valoración del riesgo de úlceras por presión en una Unidad de geriatría. *Gerokomos,* 2007;18(3):135-139.

19. Lucena A, Dos Santos C, Pereira A, Almeida M, Mendes V, Friedich M. Perfil clínico e diagnósticos de enfermagem de pacientes em risco para úlcera por pressão. *Rev. Latino-Am Enfermagem*. 2011;19 (3):523-530.
20. Liu M, Chen W, Liao Q, Gu Q, Hsu M, Poon A. Validação de duas escalas de avaliação de risco de úlceras de pressão em utentes chineses da UCI. 2013;3(9):145-150.
21. Roosen K, Fulbrook P, Nowicki T. Pressure injury prevention: continence, skin hygiene and nutrition management. *Australian Nursing Journal*. 2010;18(2):31-34.
22. Bianchi J, Beldon P, Callaghan R, Stephen-Hayn J. Barrier products: Effective use of a barrier cream and film. *Wounds UK*. 2013;9(1):82-88.
23. Shanin ESM, Dassen T, Halfens R. Incidence, prevention and treatment of pressure ulcers in intensive care patients: A longitudinal study. *International Journal of Nursing Studies*. 2009;46:413-421.
24. El Enein NYA, Zaghloul AA. Nurses' knowledge of prevention and management of pressure ulcer at a Health Insurance Hospital in Alexandria. *International Journal of Nursing Practice*. 2011;17:262-268.
25. Rogenski N, Kurcgant P. The incidence of pressure ulcers after the implementation of a prevention protocol. *Rev. Latino-Am. Enfermagem*. 2012;20(2):333-339.
26. Martínez Cuervo F, Pareras Galofré E. La efectividad de los ácidos grasos hiperoxigenados en el cuidado de la piel perilesional, la prevención de las úlceras por presión, vasculares y de pie diabético. *Gerokomos*. 2009;20(1):41-46.
27. Moore Z, Cowman S, Conroy R. A randomised controlled clinical trial of repositioning, using the 30° tilt, for the prevention of pressure ulcers. *Journal of Clinical Nursing*. 2011;20:2633-2644.
28. Luque Moreno C, Peña Salinas M, Rodríguez Pappalardo F, López Rodríguez L. Prevención de úlceras por presión y lesiones músculo esqueléticas: paciente con ictus. *Gerokomos*. 2012;23(1):42-46.
29. Sakai K, Sanada H, Matsui N, Nakagami G, Sugama J, Komiya C, Yahagi N. Continuous monitoring of interface pressure distribution in intensive care patients for pressure ulcer prevention. *Journal of Advanced Nursing*. 2009;65(4):809-817.
30. Hagisawa S, Ferguson-Pell M. Evidence supporting the use of two-hourly turning for pressure ulcer prevention. *Journal of Tissue Viability*. 2008;17:76-81.
31. Hampton S, Tadej M, Young S, Bree-Aslan C. Aderma™ Heel Pads in the prevention of pressure ulcers in nursing homes. *Wounds UK*. 2012;8(4):125-129.
32. Santamaría N, Gerdzt M, Sage S, McCann J, Freeman A, Vassiliou T, DeVincenzo S, Ng AW, Manias E, Liu W, Knott J. A randomised controlled trial of the effectiveness of soft silicone multi-layered foam dressings in the prevention of sacral and heel pressure ulcers in trauma and critically ill patients: the border trial. *Int Wound J*. 2013;1-7.
33. Torra I Bou J-E, Rueda J, Camañes G, Herrero E, Blanco J, Ballasté J, Hernández E, San Miguel L, Verdú J. Preventing Pressure Ulcers on the Heel: A Canadian Cost Study. *Dermatology Nursing*. 2009;21(5):268-272.
34. Manzano F, Perez AM, Colmenero M, Aguilar MM, Sánchez Cantalejo E, Reche AM, Talavera J, López F, Barco SFD, Fernández-Mondejar E. Comparison of alternating pressure mattresses and overlays for prevention of pressure ulcers in ventilated intensive care patients: a quasi-experimental study. *Journal of Advanced Nursing*. 2013;69(9):2099-2106.
35. Jackson M, McKenney T, Drumm J, Merrick B, LeMaster T, VanGilder C. Pressure Ulcer Prevention in High-Risk Postoperative Cardiovascular Patients. *Critical Care Nurse*. 2011;31(4):44-53.
36. Malbrain M, Hendriks B, Wijnands P, Denie D, Jans A, Vanpellicom J, De Keulenaer B. A pilot randomised controlled trial comparing reactive air and active alternating pressure mattresses in the prevention and treatment of pressure ulcers among medical ICU patients. *Journal of Tissue Viability*. 2010;19:7-15.

- 
37. Jaul E. Assessment and Management of Pressure Ulcers in the Elderly. *Drugs Aging*. 2010;27(4):311-325.
 38. Shahin E, Dassen T, Halfens R. Incidence, prevention and treatment of pressure ulcers in intensive care patients: A longitudinal study. *International Journal of Nursing Studies*. 2009;46:413–421.
 39. Gorecki C, Brown J, Dealey C, McGinnis E, Cano S, Nelson A, Lamping D, Stubbs N, Briggs M, Coleman S, Wilson L, Nixon J. Development and validation of a new patient-reported outcome measure for patients with pressure ulcers: the PU-QOL instrument. *Health and Quality of Life Outcomes*. 2013;11:95.
 40. Gorecki C, Lamping D, Brown J, Madill A, Firth J, Nixon J. Development of a conceptual framework of health-related quality of life in pressure ulcers: A patient-focused approach. *International Journal of Nursing Studies*. 2010;47:1525–1534.
 41. Gorecki C, Brown J, Briggs M, Nelson E, Schoonhoven L, Dealey C, Defloor T, Nixon J. Impact of Pressure Ulcers on Quality of Life in Older Patients: A Systematic Review. *J Am Geriatr Soc*. 2009;57:1175–1183.
 42. Thein H, Gomes T, Krahn M, Wodchis P. Health status utilities and the impact of pressure ulcers in long-term care residents in Ontario. *Qual Life Res*. 2010;19:81–89.
 43. Essex H, Cullum N, Clark M, Sims J, Warriner A. Health-related quality of life in hospital in patients with pressure ulceration: Assessment using generic health-related quality of life measures. *Wound Rep Reg*. 2009;17:797–805.
 44. Gorecki C, Closs J, Nixon J, Briggs M. Patient-Reported Pressure Ulcer Pain: A Mixed-Methods Systematic Review. *Journal of Pain and Symptom Management*. 2011;42(3):443-459.
 45. Langemo D, Thompson P, Hanson D, Anderson J, Hunter S. Topical Anesthesia for Pressure Ulcer Treatment. *Advances in Skin & Wound Care*. 2008;21(8):364–366.
 46. Roach R, Dexter C. The Prevention, Treatment and Liability of Pressure Ulcers In the Nursing Home. *Medicine & Health*. 2010;93(12):365-368.
 47. Ministerio de Salud de la República de Colombia. Resolución 1995 de 1999. Por la cual se establecen normas para el manejo de la Historia Clínica. Diario Oficial 43655 de agosto de 1999.
 48. Perdomo E, Navarro F, Gonzales H, Mosquera A. Cribado nutricional en pacientes inmovilizados del Servicio de Atención Domiciliaria de una zona básica de salud del Área de Salud de Gran Canaria. *Gerokomos*. 2012;23(3):118-122.
 49. Moura T, Moura M, Caetano J. O uso da escala de Braden e fotografias na avaliação do risco para úlceras por pressão. *Rev Esc Enferm USP*. 2012;46(4):858-864.
 50. Deprez J, Brusseau E, Fromageau J, Cloutier G, Basset O. On the potential of ultrasound elastography for pressure ulcer early detection. *Med. Phys*. 2011;38(4):1943-1950.
 51. Halfens R, Bours G, Van Ast W. Relevance of the diagnosis 'stage 1 pressure ulcer': an empirical study of the clinical course of stage 1 ulcers in acute care and long-term care hospital populations. *Journal of Clinical Nursing*. 2001;(10):748-757.
 52. Quesada C, García R. Evaluación del grado de conocimiento de las recomendaciones para la prevención y el cuidado de úlceras por presión en Unidades Críticas. *Enferm Intensiva*. 2008;19(1):23-34.
 53. Moore Z. Pressure ulcer grading. *Nursing Standard*. 2005;19(52):56-64.

54. Jaul, E. Assessment and Management of Pressure Ulcers in the Elderly Current Strategies. *Drugs Aging*. 2010;27(4):311-325.
55. García F, Soldevilla J, Pancorbo P, Verdú J, López P, Rodríguez M. Clasificación-categorización de las lesiones relacionadas con la dependencia. Serie Documentos Técnicos GNEAUPP nº II. Grupo Nacional para el Estudio y Asesoramiento en Úlceras por Presión y Heridas Crónicas. Logroño. 2014.
56. Hampton S, Tadej M, Young S, Bree-aslan C. Aderma Heel Pads in the Prevention of Pressure Ulcers in Nursing Homes. *Wounds UK*. 2012;8(4): 125-129.
57. Restrepo J, Verdú J. Medida de la cicatrización en úlceras por presión. ¿Con qué contamos? *Gerokomos*. 2011;22(1):35-42.
58. Sprakes K, Tyrer J. Improving wound and pressure area care in a nursing home. *Nursing Standard*. 2010;25(10):43-49.
59. Roach R, Dexter C. The Prevention, Treatment and Liability of Pressure Ulcers in the Nursing Home. *Medicine & Health/Rhode Island*. 2010;93(12):365-368.
60. Días C, Mortosa J, Ferreira E, Souza R, Aniceto L, Veiga R y Mattos L. Mensuração de área de úlceras por pressão por meio dos softwares Motic e do AutoCAD. *Rev Bras Enferm*, Brasília. 2012;65(2):304-308.
61. Bilgin M, Yapucu Ü. A Comparison of 3 Wound Measurement Techniques: Effects of Pressure Ulcer Size and Shape. *J Wound Ostomy Continence Nurs*. 2014;40(6):590-593.
62. Baumgarten M, Margolis D, Selekof J, Moye N, Jones P, Shardell M. Validity of pressure ulcer diagnosis using digital photography. *Wound Healing Society*. 2009;17:287-290.
63. Kelly J, Isted M. Assessing nurses' ability to classify pressure ulcers correctly. *Nursing Standard*. 2011;26(7):62-71.
64. Defloor T, Schoonhoven L. Inter-rater reliability of the EPUAP pressure ulcer classification system using photographs. *Journal of Clinical Nursing*. 2004;13:952-959.
65. HEALTHPAHT. New Technology for Assessment. MOWA (Mobile Wound Analyzer). Consultado en línea: <http://www.healthpath.it/imowa.html>
66. Mohammad Y, Al-Hussami M, Anthony D. Pressure ulcer prevention and treatment knowledge of Jordanian nurses. *Journal of Tissue Viability*. 2013;22:1-11.
67. Gray M. (2010). Optimal Management of Incontinence-Associated Dermatitis in the Elderly. *Am J Clin Dermatol*. 2010;11(3):201-210.
68. Kuffler D. Techniques for Wound Healing with a Focus on Pressure Ulcers Elimination. *The Open Circulation and Vascular Journal*. 2010;3:72-84.
69. Shahin, E, Dassen, T, Halfens R. Incidence, prevention and treatment of pressure ulcers in intensive care patients: A longitudinal study. *International Journal of Nursing Studies*. 2009;46:413-421.
73. González R, Verdú J. Calidad de vida y cicatrización en pacientes con úlceras de etiología venosa. Validación del Charing Cross Venous Ulcer Questionnaire, versión española (CCVUQ-e) y del Pressure Ulcer Scale for Healing, versión española (PUSH-e). Resultados preliminares. *Gerokomos*. 2011;22(3):131-136.
70. Conceição V, Sellmer D, Massulo M. Confiability inter-observadores del pressure ulcer scale for healing (PUSH) en pacientes con úlceras crónicas en la pierna. *Rev Latino-am Enfermagem*. 2007;15(3): 391-396.
71. Verdú J, Perdomo E. Nutrición y Heridas Crónicas. Serie Documentos Técnicos GNEAUPP nº 12. Grupo Nacional para el Estudio y Asesoramiento en Úlceras por Presión y Heridas Crónicas. Logroño. 2011.
72. Rogenski N, Kurcgant P. The incidence of pressure ulcers after the implementation of a prevention protocol. *Rev. Latino-Am. Enfermagem*. 2012;20(2):333-339.
73. Moore Z, Cowman S, Conroy R. A randomised controlled clinical trial of repositioning, using the 30° tilt, for the prevention of pressure ulcers. *Journal of Clinical Nursing*. 2011;20:2633-2644.
10. García-Fernández FP, Pancorbo-Hidalgo PL, Verdú Soriano, Soldevilla- Agreda JJ, Rodríguez-Palma M, Fornells M, et al. Eficacia de los productos para el tratamiento de las úlceras por presión: una revisión sistemática con metaanálisis. *Gerokomos*. 2007;18(1):36-48.
74. Onesti M, Fioramonti P, Carella S, Fino P, Sorvillo V, Scuderi N. A new association between hyaluronic acid and collagenase in wound repair: an open study. *European Review For Medical And Pharmacological Sciences*. 2013;17(2):210-216.
75. Silveira S, Dias T. Papain Associated with Urea in the Debridement of Necrotic Wounds. *Journal Of Phlebology & Lymphology*. 2010;3:6-7.
76. Gottrup F, Jørgensen B. Maggot Debridement: An Alternative Method for Debridement. *Eplasty: Open Access Journal Of Plastic Surgery*. 2011;11:290-302.
77. Cazander G, Pritchard D, Nigam Y, Jung W, Nibbering P. Multiple actions of Lucilia sericata larvae in hard-to-heal wounds. *Bioessays*. 2013;35:1083-1092.
78. Turkmena A, Graham K, McGrouther D. Therapeutic applications of the larvae for wound debridement. *Journal of Plastic, Reconstructive & Aesthetic Surgery*. 2010;63(1):184-188.

79. Mumcuoğlu K, Taylan Ozkan A. The treatment of suppurative chronic wounds with maggot debridement therapy. *Türkiye Parazitolojii Dergisi/Türkiye Parazitoloji Derneği*. Acta Parasitologica Turca/Turkish Society For Parasitology. 2009;33(4):307-315.
80. Schiffman J, Golinko M, Yan A, Flattau A, Tomic-Canic M, Brem H. Operative Debridement of Pressure Ulcers. *World J Surg*. 2009;33:1396–1402.
81. Gethin G. The role of antiseptics in pressure ulcer management. *Nursing Standard*. 2011;26(7):53-60.
82. Grupo Nacional para el Estudio y Asesoramiento en Úlceras por Presión y Heridas Crónicas. Directrices Generales Sobre El Tratamiento de las Ulceras por Presión. Logroño. 2003.
83. Biglari B, Linden P, Simon A, Aytac S, Gerner H, Moghaddam A. Use of Medihoney as a non-surgical therapy for chronic pressure ulcers in patients with spinal cord injury. *Spinal Cord*. 2012;50:165–169.
84. Ciliberti M, De Lara F, Serra G, Tafuro F, Lazzetta F, De Martino V, Filosa A, Scognamiglio R, Ciliberti G, Veneri M. Effective management of pressure ulcers using Hydrofibre technology with silver ions. *Wound Medicine*. 2014;5:40–44.
85. Lavandera I. Curación de heridas sépticas con miel de abejas. *Revista Cubana de Cirugía*. 2011;50(2):187-196.
86. Ho C, Bensitel T, Wang X, Bogie K. Pulsatile Lavage for the Enhancement of Pressure Ulcer Healing: A Randomized Controlled Trial. *Physical Therapy*. 2012;92:38-48.
87. National Pressure Ulcer Advisory Panel & European Pressure Ulcer Advisory Panel. Prevention and Treatment of Pressure Ulcers: Clinical Practice Guideline. Washington DC: National Pressure Ulcer Advisory Panel. 2009.
88. Benbow M. Wound swabs and chronic wounds. *Practice Nurse*. 2010;39(9):27-30.
89. Lefemine V, Enoch S, Boyce D. Surgical and reconstructive management of pressure ulcers. *Eur J Plast Surg*. 2009;32:63-75.
- 90 Alepuz Vidal L, Benítez Martínez J, Casaña Granell J, Imbernón JC, Fornes Pujalte B, García Molina P, Giménez Tébar JL, López Casanova P, Márquez Mendoza M, Montal Navarro MA, Sanchis Sánchez E, Verdú Soriano J, Vergara Hernández C. Guía de Práctica Clínica para el Cuidado de Personas con Úlceras por Presión o Riesgo de Padecerlas. Generalitat Valenciana. Conselleria de Sanitat. 2012:271 p.
91. Malbrain M, Hendriks B, Wijnands P, Denie D, Jans A, Vanpellicom J, De Keulenaer B. A pilot randomised controlled trial comparing reactive air and active alternating pressure mattresses in the prevention and treatment of pressure ulcers among medical ICU patients. *Journal of Tissue Viability*. 2010;19:7-15.
92. Makhsous M, Lin F, Knaus E, Zeigler M, Rowles D, Gittler M, Bankard J, and Chen D. Promote Pressure Ulcer Healing in Individuals with Spinal Cord Injury Using an Individualized Cyclic Pressure-Relief Protocol. *Advances in skin & wound care*. 2009;22(11):514-521.
93. Hollisaz, M., Khedmat, H., Yari, F. A randomised clinical trial comparing hydrocolloid, phenytoin and simple dressings for the treatment of pressure ulcers. *BMC Dermatology*. 2004;4:18.
94. Stafiej J., Szewczyk M. Treatment of Full-Thickness Pressure Ulcers With a Gentamicin Sponge: A Case Report. *J WOCN*. 2012;39:331-341.
95. Houghton P, Campbell K, Fraser C, Harris C, Keast D, Potter P, Hayes K, Woodbury M. Electrical stimulation therapy increases rate of healing of pressure ulcers in community-dwelling people with spinal cord injury. *Arch Phys Med Rehabil*. 2010;91(5):669-78.
96. Franek A, Kostur R, Polak A, Taradaj J, Szlachta Z, Blaszczak E, Dolibog P, Dolibog P, Koczy B, Kucio C. Using High-Voltage Electrical Stimulation in the Treatment of Recalcitrant Pressure Ulcers: Results of a Randomized, Controlled Clinical Study. *Ostomy Wound Management*. 2012;58(3):30–44.
97. Durović A, Marić D, Brdareski Z, Jevtić M, Đurđević S. The effects of polarized light therapy in pressure ulcer healing. *Vojnosanit Pregl*. 2008;65(12):906–912.

- 
98. Shamimi K, Karimian R, Nasli E, Kamali K, Chaman R, Farhadi M, Madani S, Larijani B, Khorram H. Topical application of Semelil (ANGIPARS™) in treatment of pressure ulcers: A randomized clinical trial. DARU. 2008;16(1):54-57.
 99. Shamimi K, Heshmat R, Karimian R, Nasli E, Larijani B, Novitsky Y, Farhadi M, Gharibdoust F. Intravenous Semelil (ANGIPARS™) as a novel therapy for pressure Ulcers: A randomized clinical trial. DARU. 2008;16(Suppl. 1):49-53.
 100. Dorai A. Wound care with traditional, complementary and alternative medicine. Indian Journal of Plastic Surgery. 2012; 45(2):418-24.
 101. Miller M, Oregon M, McDaniel C, Serena T. Negative pressure wound therapy: An option for hard-to-heal wounds. Nursing Homes: Long Term Care Management. 2006;55(1):56-61.
 102. Langer V, Bhandari P, Rajagopalan S, Mukherjee M. Negative pressure wound therapy as an adjunct in healing of chronic wounds. Int Wound J. 2013;doi:10.1111/iwj.12132
 103. Desai K, Hahn E, Pulikkottil B, Lee E. Negative Pressure Wound Therapy: An Algorithm. Clin Plastic Surg. 2012;39:311–324.
 104. Cereda E, Gini A, Pedrolli C, Vanotti A. Disease-Specific, Versus Standard, Nutritional Support for the Treatment of Pressure Ulcers in Institutionalized Older Adults: A Randomized Controlled Trial. JAGS. 2009;57:1395–1402.
 105. Lee S, Posthauer M, Dorner B, Redovian V, Maloney M. Pressure Ulcer Healing with a Concentrated, Fortified, Collagen Protein Hydrolysate Supplement: A Randomized Controlled Trial. Advances in Skin & Wound Care. 2005;19(2):2-96.
 106. Yamamoto T, Fujioka M, Kitamura R, Yakabe A, Kimura H, Katagiri Y, Nagatomo H. Evaluation of Nutrition in the Healing of Pressure Ulcers: Are the EPUAP Nutritional Guidelines Sufficient To Heal Wounds?. Wounds. 2009;21(6):153–157
 107. Anholt R, Sobotka L, Meijer E, Heyman H, Groen H, Topinkova E, Leen M, J.M.G.A. Specific nutritional support accelerates pressure ulcer healing and reduces wound care intensity in non-malnourished patients. Nutrition. 2010;26(86):7–872.
 108. Sugino H, Hashimoto I, Tanaka Y, Ishida S, Abe Y, Nakanishi H. Relation between the serum albumin level and nutrition supply in patients whit pressure ulcers: retrospective study in an acute care setting. J. Med. Invest. 2014;61:15-21.
 109. Diaz S, Li X, Rodríguez L, Salgado CJ. Update in the Surgical Management of Decubitus Ulcers. Anoplastology. 2013;2(3):113.
 110. Sapountzis S, Hyoing Joon P, Ji Hoon K, Chantes A, Rong Min B, Chan Yeong H. The 'reading man flap' for pressure sore reconstruction. Indian Journal Of Plastic Surgery. 2011;44(3):448-452.