NATIONAL UNIVERSITY OF PUBLIC SERVICE Doctoral School of Military Science

A review of the doctoral dissertation (PhD) titled

The application of modern wound care in qualified situations

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1. Identification of the scientific problem

Modern wound care treatments and their beneficial effects are of great importance today, as both in the civil sphere and in the course of military activities new challenges arose in the field of wound care.

In civilian life, due to traffic, work and household accidents, in disaster situations caused by extreme weather and during terrorist attacks, high energy injuries with severe soft tissue damage occur more frequently. Slow-healing, chronic and infected wounds are more common.

With changes in the nature of military operations and the intensification of asymmetric conflicts, the medical attendance of the damaged in areas of operations is undergoing a transformation. There are increasing needs for evacuation carried out as soon as possible after prompt and professional life- and limb-saving care compiling with the principles of damage control and final home care. On the other hand, within the framework of humanitarian activity, there are constraints on the medical attendance of the chronic and infected wounds of the civilian population. The aim is providing final treatment as soon as possible, because during healing the capacity available for the soldiers' treatment decreases.

The general idea of my research was seeking solutions to the aforementioned challenges. I studied what answers and in what form the so-called vacuum-assisted wound care system can give to the raised problems both in peacetime and during military operations. I was looking for an answer to what single directives the aforementioned wound care method can be integrated on into a health-care system built and operated according to the principles set out in NATO's relevant documents (AJP 4.10, MC 326/3) in areas of operations.

2. Objectives

- 1. Identification, characteristics and a summary of the essential treatment principles of the types of wounds to be studied
- 2. Study and representation of the wound healing process from molecular biology aspects aligned with the research plan.
- 3. Understanding and introducing the application of the vacuum-assisted wound care system, collecting and summarizing my related experiences.
- 4. Single summarization of the system with recommendations concerning the different types of wounds in Hungarian

- 5. Integrating the method into the health care system of the areas of operations.
- 6. Elaboration of treatment protocols of severe injuries with extensive soft tissue damage based on uniform guidelines; examination of treatment options and methods of the vacuum therapy in areas of operations.
- 7. Making recommendations to the usability of the results obtained from applying the system.

3. Methods

- 1. Making a research plan
- 2. Study, collection, analysis and summary of the literature of the subject
- Study of the types of wounds to be examined, acquisition and application of basic wound care procedures
- 4. Examination of the wound healing process with the application of the vacuum-assisted wound treatment system
- 5. Introduction of the application of the vacuum-assisted wound care method
- 6. My own experiences concerning the application of the method
- Elaboration of treatments broken down by different types of wounds on the basis of my own experiences and international literary data
- Study of the structure of health care systems in areas of operations and the integration of vacuum-assisted therapy into the medical care system from logistics and therapeutic aspects
- **9.** Elaboration of a protocol for attending injuries with severe soft tissue damage in areas of operations applying the vacuum-assisted wound care system

4. A short summary of my studies and experiences

4.1. Summary of my experiences with the vacuum-assisted wound care system

I have introduced the application of the vacuum-assisted wound care system at my workplaces (Central Army Hospital, Hospital Royo Villanova, Zaragoza, Spain). I have treated or taken part in the attendance of 88 acute, chronic and infected wounds with the application of this method. During the treatments, I applied suction treatment in 74 cases

and suction-flush therapy in 14 cases. In 16 cases there was a conversion to outpatient treatment by using a portable unit.

types of wounds (number of cases)		V.A.C. suction treatment	V.A.C. suction-flush treatment
acute / trauma (26)	soft tissue (16)	14	2
	open fracture/joint (8)	4	4
	abdominal compartment syndrome (2)	2	-
chronic (35)	venous ulcer (8)	8	-
	pressure ulcer (18)	18	-
	diabetic wound (9)	8	1
infected (27)	superficial wound infection (11)	9	2
	abscess (6)	6	-
	joint infection (5)	3	2
	chronic osteomyelitis (5)	2	3
TOTAL NUMBNER OF CASES		74	14

I have been carrying out three comparative studies:

- 1. A comparison of treatments with traditional wet bandage and the vacuum-assisted wound care system in case of compartment syndrome after a leg fracture
- 2. A comparative analysis of treatments of post-operative wound infections after femoral fractures around the hip joints with traditional wet bandage and the vacuum-assisted wound care system
- **3.** A comparative study of suction and suction-flush vacuum-assisted wound care treatments of post-operative wound infections after femoral fractures around the hip joints

4.2. Study of health system in areas of operations

The study of the health system in areas of operations was the following chapter of my research on the basis of literary data and my own experiences acquired in areas of operations (ROLE 2E, Kabul, 2005.)

5. Conclusions

I have made the following conclusions on the basis of my studies and experiences:

- 1. The vacuum-assisted wound care system with appropriate adjustments and in suitable conditions is applicable at open fractures and joints not covered with soft tissues and
- 2. The vacuum therapy is more effective than the traditional treatment of wet bandage in cases of both acute soft tissue damages and infected wounds.
- 3. The suction-flush therapy is more effective than the suction therapy in case of treatment of infected wounds.
- 4. The vacuum-assisted wound care system meets the demands of asymmetric warfare and can be effectively integrated into the health system of areas of operations for the treatment of serious and hard-to-heal wounds.

6. Scientific findings

- I have introduced among the first ones in Hungary the routine application of the vacuum-assisted wound care system in the Central Army Hospital and at my Spanish workplace (Hospital Royo Villanova, Zaragoza).
- 2. I have prepared the first Hungarian summary of the vacuum-assisted wound care system elaborating treatment principles broken down by different types of wounds.
- 3. Based on my experiences I have found that the vacuum-assisted wound care system is applicable in cases of both open fractures not covered with periosteum and open joints and I have developed a protocol for their treatments
- 4. I found that the system meets the needs of modern warfare concerning wound care and I developed a protocol for the treatment of injuries with severe soft tissue damage in areas of operations applying the vacuum-assisted wound care system.

7. Treatment protocols

7.1. Treatment of injuries with soft tissue damage in areas of operations applying the vacuum-assisted wound care system

- 1. Pre-hospital treatment
 - Carrying out life- and limb-saving interventions on the spot
 - Speedy delivery to the nearest healthcare facility
- 2. Hospital treatment
 - Primary surgery based on the principles of Damage Control Surgery
 - Intensive care to stabilize the general condition of the injured
- 3. Fast and professional airlift from areas of operations
- 4. Definitive surgical care in the home country

7.2. Treatment protocol of open fractures and open joint injuries not covered with soft tissues applying the vacuum-assisted wound care system

- 1. Primary surgical treatments (debridement, etc.)
- 2. Application of the vacuum-assisted wound care system
 - 2.1. Open fractures
 - 100 mmHg pressure, low intensity
 - Using white (PVA), pre-moistened sponge
 - continuous therapy until the first redress of the wound, then intermittent therapy
 - 2.2. Open joints
 - 75-100 mmHg pressure, high intensity
 - Using white (PVA), pre-moistened sponge
 - frequent (every 24, max. 48 hours) redressing of the wounds with revision of the joints
 - In the absence of soft tissue coverage, 4-5 days of treatment (up to one week) to prevent cartilage damage
- 3. Secondary surgical treatments (wound closure, skin replacement)

8. Recommendations

- 1. I recommend the routine introduction of the application of the vacuum-assisted wound care method at any ROLE 2 and ROLE 3 level in areas of operations.
- 2. I recommend the routine application of the method in areas of operations for the treatment of the chronic and infected wounds of the civilian population within the framework of humanitarian assistance.
- 3. I recommend the introduction of the treatment protocol I developed into the training of military medical personnel.
- 4. I recommend considering the practical incorporation of the vacuum-assisted therapy method into the Hungarian medical training system (doctors, nurses) and its inclusion into official textbooks as a separate chapter.

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Curriculum Vitae

Place and date of birth:	Budapest, Hungary, 26. May 1971	
Secondary education:	ELTE Radnóti Miklós Grammar School (1989)	
Diploma:	Semmelweis University, Faculty of Medicine(1996)	
Professional examination:	1. Orthopedics (2001)	
	2. Traumatology (2003)	

Workplaces, positions:

- Semmelweis University Institute of Anatomy Nr. II. (1989-1990, dissector assistant)
- MÁV Hospital Casualty and Emergency Department(1992-1996, nursing assistant)
- MH Central Army Hospital, Traumatology (1996-2008, assistant professor-captain)
- Hospital Royo Villanova, Zaragoza, Spain (2008-..., specialist)

Research:

• Shoulder anatomy and its surgical explorations

SE II. Nr. II Institute of Anatomy; SE Faculty of Health Sciences, Department of Orthopedics

- Treatment options of special, hard-to-healing wounds
 - MH Central Army Hospital; Hospital Royo Villanova, Zaragoza, Spain

Education

- Szentágothai János Health Vocational School (traumatology 2000-2001)
- Training of resident physician (orthopedics, traumatology, 2001- ...)
- Hungarian Society of Shoulder and Elbow Surgery (founder) post-graduate courses
- Spanish shoulder arthroscopy courses (professional instructor)

Publications

- Two national competition places (2000)
- 53 Hungarian and foreign language publications (articles, lectures)

External service

• Afghanistan, Kabul, ISAF (2005)

Language exams

- Intermediate Spanish, basic English and German, state level
- Intermediate English exam at the university

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