

THE MENTORING SCHEME IN CLINICAL NURSING INVOLVING CHRONIC WOUND TREATMENT, AS AN EFFICIENT TOOL FOR PROFESSIONAL DEVELOPMENT – A STUDY OF 3 CASES

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A. Study design/planning • B. Data collection/entry • C. Data analysis/statistics • D. Data interpretation • E. Preparation of manuscript • F. Literature analysis/search • G. Funds collection

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ABSTRACT

Introduction: Increasing the level of knowledge and the quality of health care is crucial to upgrade the status of medical practitioners. Part of this process is the mentoring scheme. Mentoring based on a partnership approach can bring numerous benefits and undoubtedly contribute to sustaining an international trend for continuous development of nursing as an independent profession.

Aim of the study: Presentation of a mentoring programme involving professional care and local wound treatment by young trainee nurses.

Material and methods: Three persons were selected from a group of 30 patients with chronic wounds, consulted and treated within the activities of the student scientific circle. These 3 patients underwent limb amputation due to peripheral arterial disease between 2018 and 2021.

Results: Through specialist assistance and local wound treatment in 3 patients, young professionals and students supervised by an experienced clinician could broaden their knowledge concerning patient care and participate in local wound treatment using innovative methods.

Conclusions: The mentoring programme is an efficient form of education and development of young nurses. Nursing practice based on mentoring prepares students for their future work in a more professional way and at the same time teaches self-reliance and decisiveness. The mentoring programme allows for selecting leaders in the field, upgrading the status of the profession, and improving the quality of the provided care.

Key words: mentoring, nurse, wound treatment, clinical nursing, controlled negative pressure.

INTRODUCTION

Over several decades, the teaching of nursing has continued to evolve in line with the trend to achieve greater self-reliance, not only in caring and educational, but also therapeutic and diagnostic areas. Realizing the directions of professional development requires experienced teaching staff. In the era of demographic decline and aging society (including healthcare personnel – the mean age of nurses in Poland is 53 years), this aspect shall be viewed from a broader perspective of potential benefits and losses [1-3].

Graduate and post-graduate training is governed by laws and regulations formulated in the Act on the Professions of Nurse and Midwife [4]. The training of nurses comprises 3 years of study (bachelor's degree) optionally followed by 2 years of complemen-

tary study (master's degree) [4, 5]. Young graduates then have the possibility of further professional development during training in a chosen nursing specialty [4, 5].

Mentoring is linked to the development and adaptation to professional work of young trainee nurses. The process, which can be short or long term, is also associated with the relationship between a more experienced (a mentor) and less experienced (a tutee) person. Clinical mentoring ensures that students and nurses are safely inducted into the skills in clinical practice with an eye to bridging the gap between theory and practice [6]. Mentoring is based on inspiration and leadership, where tutees are motivated by objectives through a constructive dialogue [7, 8]. Coaching and mentoring as strategies of personal development are becoming increasingly popular in many fields, including nursing [9]. Relations in coaching and mentor-

ing enhance professional development and a sense of job satisfaction and fulfilment. Additionally, they allow leaders the opportunity to introduce new solutions that will make nursing better and more modern.

The history of mentoring dates back to ancient times, whereas the contemporary model of mentoring has its origins in the USA and was introduced in the 1970s. The Polish model, based on American and European schemes, was developed in the 1990s [9]. Mentoring is defined as guidance, counselling, and sharing experiences with the tutee so as to realize all their potential to achieve professional and personal goals [10].

AIM OF THE STUDY

The aim of the study is to present the mentoring scheme in professional care and local wound treatment by young trainee nurses associated in the Student Scientific Circle for Elderly Care at the Institute of Health Sciences, University of Rzeszów.

MATERIAL AND METHODS

The method of observation and a case study were used in designing the study. Three persons were selected from the group of 30 patients with chronic wounds, consulted and treated in a home setting within the activities of the student scientific circle. The selected patients (2 men and 1 woman), aged 65, 50, and 78 years, respectively (mean age 64.3 years) underwent limb amputation due to ischaemia secondary

to peripheral arterial disease (PAD) between 2018 and 2021. In each case, professional care was provided by a team composed of a mentor (nurse clinician), registered nurses (with a bachelor's degree) and nursing students. Each patient gave their informed consent for the treatment as well as presentation of the data and photographs. The patients enrolled in the study gave their consent based on the provisions included in the Helsinki Declaration (Resolution of the Bioethics Committee of the University of Rzeszów No. 30/6/2017).

RESULTS

Case 1

A man aged 65 years (Fig. 1). History revealed hypertension, type 2 diabetes, stage 5 kidney disease, and haemodialysis since 2014. Status post percutaneous coronary angioplasty (PCI), myocardial infarction in 2002, amputation of the hallux of the left foot, followed by amputation of the lower extremity below the knee due to critical limb ischaemia and wound infection.

At the request of the family, the first follow-up appointment was at the patient's house a few days after he was discharged home. The patient was consulted by an experienced clinician and an assistant doctor who carried out a medical interview, physical examination, and familiarised themselves with medical records. The patient was oriented and verbally responsive. Examination revealed a normal heart rate of 82 bpm, blood pressure of 130/70 mmHg, oxygen

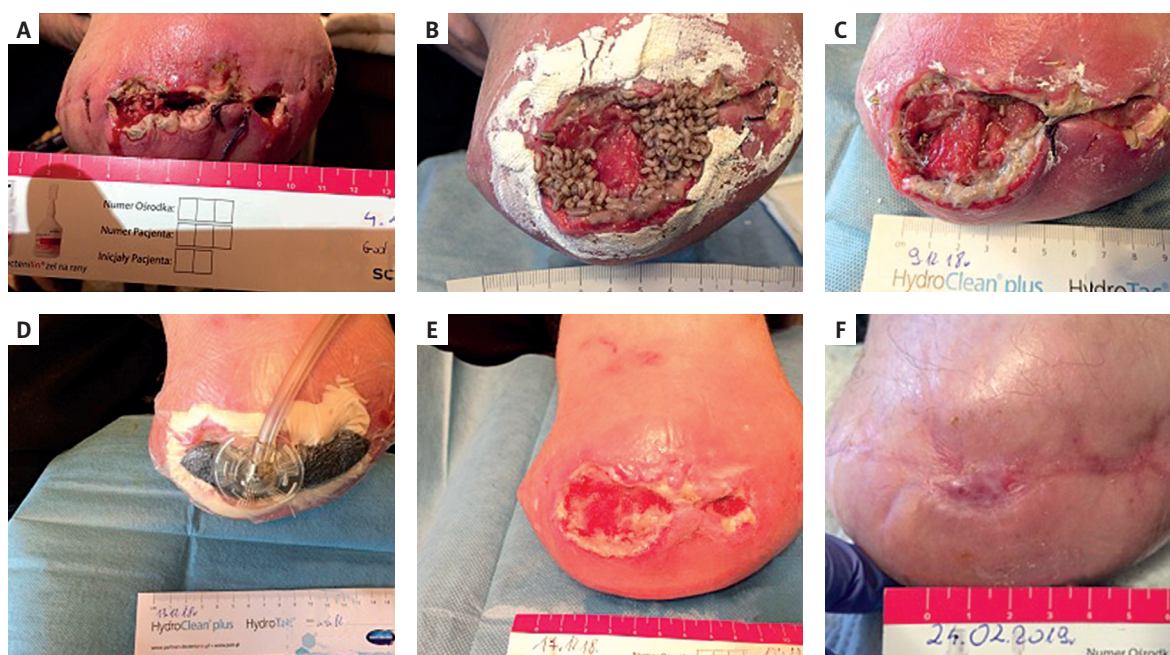


Figure 1. A) Wound at the first physician visit, B) MDT on the 3rd day, C) two tunnels after removing the larvae on the 3rd day, D) NPWT therapy, the dressing sealed with stoma paste, pressure of 100 mmHg, E) reduced depth and size of the wound, bloody red tissue, beginning of granulation process, therapy with dressings, F) final stage of the treatment, complete epithelialisation

saturation values of 95%, normal chest shape, spontaneous breathing, symmetrical vesicular sound in auscultation, and body temperature of 36.6°C. Status post amputation of the left lower extremity, physical examination revealed a yellow-black wound (according to the Red Yellow Black [RYB] classification) within the suture line, with signs of infection (redness, swelling) and no pain on palpation. Evaluation of tissue destruction confirmed injury extending into the muscle (stage 3/4° according to the European Pressure Ulcer Advisory Panel/National Pressure Injury Advisory Panel [EPUAP/NPIAP] classification). Following removal of devitalised wound tissue, drains were anchored and material was collected for microbiological analysis. The patient was qualified and gave his consent for maggot debridement therapy (MDT) and was informed about the treatment and dressing changes. After consulting a nephrologist, antibiotic therapy was administered based on microbiology results (infection with *Acinetobacter* and gram-negative *Klebsiella pneumoniae* (+++)).

The patient had follow-up appointments 2 or 3 times a week. The therapeutic decisions were made after having consulted the general practitioner and the doctors in charge of local wound treatment and haemodialysis. The patient received the intended MDT. Assessment of the efficacy of larvae debridement done in the first 2 days showed good results. The larvae were removed on the 3rd day. They debrided 80% of the wound bed area, exposing 2 tunnels extending into the stump tissues. The care team members agreed upon the institution of negative pressure wound therapy (NPWT) to eliminate exudate, reduce the titre of bacteria, accelerate granulation tissue, and stimulate cell proliferation and migration. Once the NPWT dressing was put on a cleansed wound, a negative pressure of 100 mmHg was applied to the wound in a continuous mode. The NPWT system (KCI ActiVac® San Antonio USA) was chosen taking account of the patient's mobility. The primary dressing was Inadine®. NPWT lasted for 30 days and was carried out using Urgostart® lipido-colloid dressing interlayers. The dressings were changed every 3-5 days, also by the students. No local skin reactions, pain, or complications were observed, and the end result was satisfying because the wound was thoroughly cleansed of residual necrotic tissue and the granulation process began.

The final step of the treatment involved the application of Algivon® alginate dressings with tea tree honey. The duration of the therapeutic process from the moment of providing care to complete healing was 80 days. The following therapeutic actions complemented the treatment: activation exercises, dietary supplementation, and health-related motivation. Once the wound healed, the stump was hardened to allow substitution with prosthesis.

Case 2

A man aged 50 years (Fig. 2). History of class 1 obesity, hypertension, and PAD. Status post amputation of the fourth and fifth toe of the right foot in July 2020, followed by amputation below the knee due to progressing phlegmon within the surgical wound, no signs of healing and persisting fever. The patient was provided with recommendations and discharged home.

The first follow-up appointment took place a month after the discharge. The wound was examined by an experienced clinician and assistants, who obtained a medical history, carried out a physical examination, and analysed medical records. The patient demonstrated no autopsychic and allopsychic orientation disturbances, with basic vital parameters within normal limits, heart rate of 80 bpm, loud heart sounds, regular pulse, oxygen saturation values of 97%, blood pressure of 135/80 mmHg, body temperature of 36.6°C, the chest normally shaped and pain-free, symmetrical vesicular sound over the lung fields on auscultation, and vesicular resonance.

In accordance with the RYB classification, a yellow-black wound of 3 × 15 cm (45 cm²) was found in physical examination within the suture line on the right shank stump, with liquefactive necrosis, exudate of medium intensity, and reddened and swollen surrounding skin. The wound was classified as unstageable pressure injury (UPI) according to the EPUAP/NPIAP classification. Mild pain (visual analogue scale [VAS] score 1-3) was experienced on palpation. Having cleansed the wound surface, PVP-I (betadine and paraffin-based) dressings were applied, and the patient was qualified for MDT. Positive cultures of *Pseudomonas aeruginosa* and *Klebsiella pneumoniae* (+++) were found in the previously collected specimens (wound scrapings). After consulting a general practitioner, a proper antibiotic therapy was administered. The patient received oral nutrition with Cubitan® and Argnilan® (once a day, 14 bags in a package) based on the following results of laboratory tests: albumin level of 3.9 g/dl and C-reactive protein (CRP) value of 1.94 mg/dl. He was familiarised with the principles of MDT, for which he gave his consent. *Lucilia sericata* larvae were kept on the wound for 3 days with 5-10 maggots per 1 cm² according to the procedures given in a medical protocol.

The progress of the treatment was monitored every 24 hours and consulted with a mentor using tele-informatic systems. On the 3rd day an assistant supervised by a clinician removed the biological dressing. Deep red tissue and 3 tunnels extending into the muscles of the shank were noted. It was estimated that the maggots debrided 70% of the wound bed area, and a decision on the second larval therapy was made by the mentor and the assistants. The patient



Figure 2. A) Wound at the first physician visit, B) loose larvae after 73 hours of the first MDT course, C) wound after the removal of larvae during the second course of the therapy, deep tunnels visible, D) NPWT, pressure of 125 mmHg, continuous mode, E) granulation tissue formation at the end of the therapy, application of active dressings and antiseptic gels, F) stump wound prepared for hardening

assessed the level of pain during both procedures as 2-3 points on the VAS/NRS (numeric rating scale). The final effect achieved through the treatment was 90% of the wound area debrided.

To reach the further objective of accelerating repair processes and reducing the titre of bacteria, the therapeutic team unanimously agreed upon the institution of negative pressure therapy with the Hartman® Vivano Tec Pro® system. NPWT dressing was applied on the previously cleansed wound with a pressure of 125 mmHg in a continuous mode and a power of II/III. The patient and his family were informed about the correct use of the system by the most experienced assistant, who supervised and controlled the therapy, remaining in constant telephone contact with the mentor, the patient, and the patient's family. The amount of exudate after removing the first dressing was approximately 100 ml. Upon consultation with the mentor, the decision was made to repeat NPWT, this time with the use of Urgo Clean Ag contact layer dressing designed to prevent newly formed granulation tissue from sticking to the spongy outer layer. Lack of pain and discomfort on removal was another advantage of the product. To drain the tunnels, an UrgoTul Ag Silver® dressing was applied.

Over the following weeks, the wound became deeply red, gave no pain, successively decreased in size, and exudation significantly diminished. The entire therapy lasted approximately 5 months and involved the following elements: MDT, application of

active dressings with antiseptic (silver, PVP-I, polyhexanide), NPWT, educating the patient and his family, physiotherapy, hardening the stump, and remodelling the scar to allow prosthetic replacement.

Case 3

A woman aged 78 years (Fig. 3). History revealed hypertension, type 2 diabetes, class 1 obesity. Status post amputation of the left lower extremity below the knee in 2020 due to massive phlegmon on the foot secondary to diabetes. The treatment was continued in outpatient settings. Given that over a period of one month there were no signs of healing within the stump, the wound was stitched at a surgery clinic and the patient was instructed to rinse the wound with an octenidine-based solution.

The first follow-up appointment in a home setting took place in July 2020. The clinician and the assistants analysed the medical records and carried out a physical examination. The patient was verbally responsive, in a depressive mood, with normal heart rate of 75 bpm, pure and properly heard heart tones, blood pressure of 135/80 mmHg, oxygen saturation values of 98%, the chest normally shaped and pain-free, symmetrical vesicular sound, vesicular resonance, and body temperature of 36.6°C. Blood glucose level 2 hours after a meal was 160 mg/dl, with normal diuresis. The amputation stump was swollen, the wound was classified as yellow-black according to the RYB classification and stage 3/4 according to

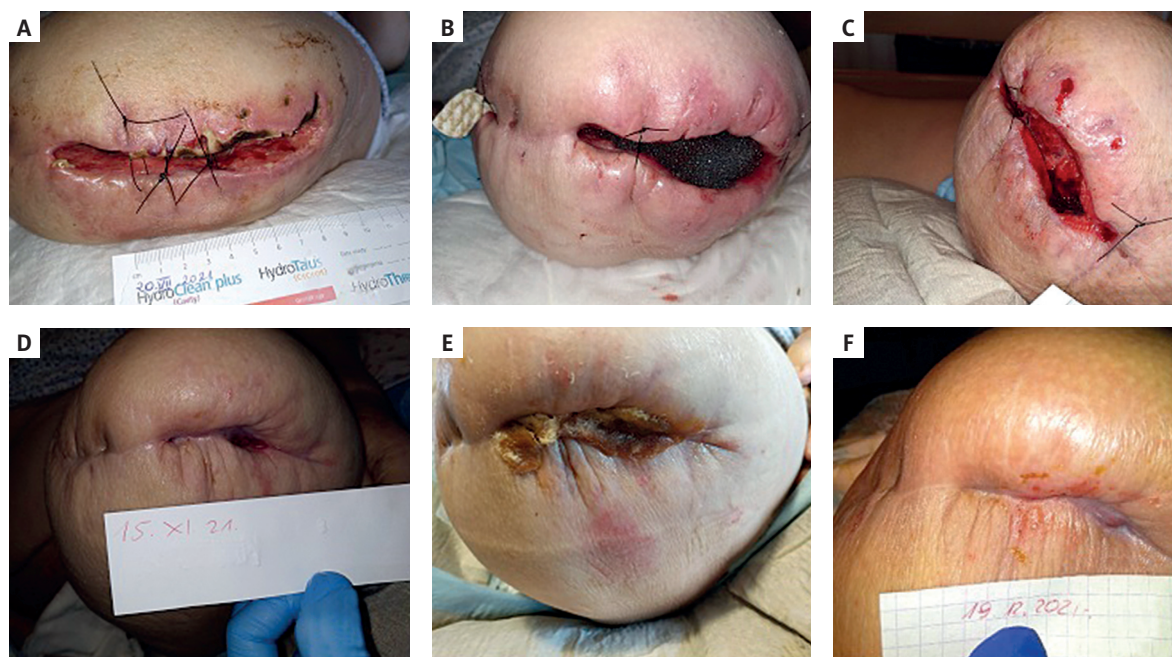


Figure 3. **A)** Wound at the first physician visit, **B)** NPWT dressing applied with tunnel drainage, **C)** wound after a few courses of NPWT and application of active dressings, **D)** treatment progress, wound on 15th November 2021, **E)** final stage of the treatment, application of dressings with medical honey, **F)** epithelialised stump wound after the therapy

the EPUAP/NPIAP classification. Massive, bloody, and purulent exudate gave off a bad odour, and the surrounding skin reddened. The patient assessed the intensity of pain on palpation as 6-7 VAS points. The first therapeutic step involved local drainage with the use of the Aquacel Ag+® and Mepilex Border® dressings. Laboratory tests were taken to measure the values of morphology, creatinine, CRP, and glycated haemoglobin. Because of low levels of albumin (2.5 g/dl), the patient received oral dietary supplementation with the Arginilan®, Nutrimil®, and Diasip® products. Diabetologist and anaesthetist helped to regulate the glucose level and reduce the pain. Having been acquainted with the proposed stages of the therapy, the patient gave her written consent for NPWT and expressed her willingness to co-operate with the entire team, comprising an experienced clinician and students of the scientific organisation. The wound was mechanically cleansed and the stitches that no longer performed their function were removed. The indentations were drained with a sponge, and a contact layer was not used so as to stimulate neoangiogenesis and better debridement of the treated area. The therapy was maintained for 3-5 days with the applied pressure of 100 mmHg in a continuous mode and a power of II. The intensity of exudate after removing the first dressing amounted to approximately 200 ml. Off-therapy periods aimed at protecting the surrounding skin lasted 3 days. The Iodine and Durafiber dressing with Sutrissept gel were applied respectively at that time.

A total of 6 therapeutic sessions gave the result of decreased size of the wound and its almost complete closure. The last stage of the treatment involved the application of the Algivon alginate and Activion Tube ointment to stimulate granulation and epithelialisation. Pain within the stump experienced only while scraping was assessed as 2-3 VAS points. The overall therapeutic process from the moment of providing professional care to complete wound closure lasted 5 months.

DISCUSSION

Wound treatment should be conducted using recommended, available methods and products for debridement and healing [11]. The methods should be chosen taking account of the condition of the wound and the pathophysiological processes that take place in it. Therapeutic measures are aimed at shortening the time of the treatment, achieving complete healing, improving the quality of life, and returning to daily activities. These objectives can only be attained through the professional work of adequately qualified medical personnel [1, 6]. The process of educating nurses is long-term, with emphasis placed on shaping attitudes and developing skills and knowledge. Were it not for experienced tutors who make daily efforts to provide specialist care, acquiring competence would not be possible for nursing students. The mentoring system in Poland is not strongly promoted. Although a lot of role models can be found in the profession, there

is still a huge shortfall of advanced practice nurses. The professional success in achieving wound closure is bound up with efficient mentoring schemes based on the partnership and therapeutic actions of the tutees performed in accordance with national recommendations and evidence-based practice guidelines as well as regular consultation of problematic issues with an experienced mentor [7]. Young nursing adepts, through their activity and participation in the process of professional care and treatment of chronic wounds, co-created the therapeutic team. They could acquire knowledge and practical skills concerning the principles of wound treatment and the assessment of the patient's condition. The practical use of the elements of physical examination (auscultation, percussion, and palpation), critical thinking, and the ability of wound debridement using various methods are among the most important advantages of mentoring programs that shape future nursing staff.

The mentoring effort, the aim of which was to professionally prepare students, was based on cyclical meetings, as a part of the activities of the Scientific Club, during which the discussed issue was introduced theoretically, valuable educational materials were suggested, self-development was encouraged through participation in numerous online training courses, and mentor observation during patient visits and discussing the health problems of patients was concluded with a debriefing and a series of answers to questions asked by the students. The implemented activities could and were at the same time an appropriate foundation for implementing the next stages of mentoring.

Studies by Górką *et al.* involving a group of 256 occupationally active nurses demonstrated that professional development is of significant importance for the majority of the respondents. The author of the study points out that mentoring is a better-known term than coaching, which suggests the need for further discussion and, in view of potential benefits, systematic training of young nursing personnel [9].

Through professional care and local treatment in 3 patients, young nurses and students supervised by an experienced clinician could broaden their knowledge concerning the aspects of health care and participate in topical wound therapy with the use of innovative methods. These competencies as well as the acquired attitudes will be developed at further stages of their career. Individual practical education has additional tangible benefits related to decisiveness and self-reliance that lead to a stronger sense of responsibility and better quality of provided care [12, 13]. Therapeutic actions under control and supervision, discussions concerning the adopted methods, and encouraging creative solutions foster the potential of young nurses, who very often feel unrecognised and unrewarded in their workplace. The legal act on the profession states that nurses not only take indepen-

dent actions concerning the evaluation of patient's condition based on anamnesis, physical examination, questionnaires, and clinical scales, but also give a diagnosis and plan a therapeutic process according to specific health care models [1, 5, 14, 15].

The pandemic ongoing for over a year has drawn the attention of the society to the potential of nursing. Caregivers, working both in hospital and home settings, provide professional help under conditions of isolation where it is not possible to continue inpatient treatment [16].

Mentoring in nursing (clinical nursing in particular) has great capacity and may play a role in the introduction of a new teaching model in which clinical knowledge and skills are more efficiently acquired.

The present system of medical education in Poland is continuously evolving to meet international standards and respond to the needs of caregivers, teachers, students, and care recipients [17]. It is therefore necessary to recognise the significance of clinical mentoring as a tool for educating competent advanced clinical nursing specialists who shall improve the quality of the provided care in the future [7, 14].

CONCLUSIONS

The mentoring system is key to the effective education and development of young nurses. Clinical practice based on mentoring prepares students for future work in a more professional way and at the same time teaches self-reliance and decisiveness. The mentoring programme enables the selection of leaders in the field, upgrading the status of the profession and improving the quality of the provided care.

Disclosure

The authors declare no conflict of interest.

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