ORIGINAL ARTICLE

A New Concept of a Multidisciplinary Wound Healing Center and a National Expert Function of Wound Healing

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Hypothesis: An independent, multidisciplinary wound healing center in an accepted national expert function of wound healing is the optimal way to improve prophylaxis and treatment of patients with problem wounds.

Design: A clinical perspective analysis.

Setting: An independent, multidisciplinary wound healing center focusing on all types of problem wounds, organized as a university hospital department, and integrated in an expert function in the national health care organization of Denmark.

Patients and Methods: Patients with all types of problem wounds referred to and treated in the center during the first years of its existence provided a model for a new multidisciplinary structure for treatment of wound patients in the health care system.

Results: During the first 3 years of the fully functioning wound healing center, a total of 23 802 patient consultations were performed in the outpatient clinic, and 1014 patients with problem wounds were hospitalized in the inpatient ward. The surgical concept of the center has resulted in improved healing rates in patients with leg ulcers and decreased rates of major amputations. The outpatient function has resulted in a decrease in the number of patients transported in beds to the center. This structure provides better opportunities for basic and clinical research as well as for establishing expert education for all types of health care personnel. The center's structure has been the background for establishing an expert function in wound healing, allowing the wound healing area area to be fully integrated in the Danish National Health Care System. Overall, the concept and structure of the center have enhanced the knowledge and understanding of wound problems and increased the status of wound healing and patient care.

Conclusions: Establishing multidisciplinary centers integrated into an accepted national expert function of wound healing is an optimal way to improve the clinical outcome of prophylaxis and treatment of all types of problem wounds. This model, with minor adjustments, may be applicable for both industrialized and developing countries.

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NONHEALING wounds are a significant problem. The frequency varies, but at any time almost 1% of the world's population experiences problem wounds, with associated costs accounting for more than 2% to 4% of health care expenses.[1-6] Furthermore, patients with problem wounds experience a serious decrease in their quality of life. These factors have led to the establishment of wound healing groups and centers as well as national and international societies worldwide. *Problem wounds* are defined as wounds that are chronic and resistant to therapy, provide an extra risk, and reduce the quality of life of the patient.

For many years, treatment of problem wounds was provided in a nonstructured fashion, involving different types of medical specialties and groups of health care workers. Recently, however, multidisciplinary approaches increasingly have been implemented in different countries with varying health care delivery systems.[6-13] In US commercial wound centers and wound care clinics in universities, regimens have been organized.[14-17] Multidisciplinary approaches to wound care in the primary health care sector as well as in hospitals have demonstrated a reduction in home visits and the range of products used.[18,19] Standardizing the treatment plans seems to improve healing of certain chronic wounds (David R. Knighton, MD, Wound Care Centers, Minneapolis, Minn, oral communication, 1992).[6,20,21]

However, the structure of teams or centers primarily has been geographi-

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METHODS

CENTER ORGANIZATION

The center organization can be divided into the following: aim, clinical activity, scientific and educational activity, and integration.

Aim of the Center

Through standardized wound classification (**Table 1**) and diagnostic and treatment plans, the center offers patients with all types of problem wounds optimal clinical care and prophylaxis. The center focuses on basic and clinical research, quality assurance, and education of all types of health care personnel.

Clinical Staff and Facilities

The center is an independent hospital department funded by the government, and consists of an outpatient clinic and an inpatient ward. The clinical staff has 52 persons and the research staff has 8 persons. The personnel employed in the center, independent of their earlier education and specialty, work full-time with patients who have problem wounds.

Multidisciplinary Staffs. The medical staff includes 5 specialist physicians and 1 to 2 medical educators. The specialists consist of 4 types of surgeons (vascular, orthopedic, gastrointestinal, and plastic surgery) and 1 dermatologist. The physicians in education are recruited from medical specialties that traditionally handle wound healing problems (such as surgery, dermatology, or other specialties). Physicians from collaborating departments are involved in the following ways: (1) daily evaluation of inpatients by a specialist in internal medicine or diabetology, (2) weekly conference with the department of vascular surgery, (3) weekly ward rounds with a specialist in microbiology who discusses microbiologic problems at the patient bed, and (4) on-call functions by physicians from the internal medical department (the physicians of the center can be reached by telephone).

The nursing staff consists of 28 persons and includes clinical and research nurses with different levels of specialization. A 2-year educational program must be completed before nurses are allowed to handle all specialized functions. A rotation program allows each nurse to learn all the functions of the center.

The podiatry staff consists of 5 persons who produce relieving shoes and boots, especially for diabetic patients with foot ulcers.

There are 2 physiotherapists specialized in rehabilitation and pressure relief materials. In addition, there are secretaries, a hospital porter, and a technician.

Besides the full-time staff, there are part-time staff including dieticians, occupational therapists, and social workers.

Outpatient Clinic. Forty to 45 patients are seen daily in the outpatient clinic. In the multidisciplinary team model, all types of staff are present simultaneously, allowing optimal treatment plans to be produced at the patient's initial visit. A total of 9 examining rooms are available. One room is used for patients involved in different types of projects (eg, research related to development of new products, basic science) and 1 room has special facilities for surgical procedures that require local anesthesia. Major surgery with general anesthesia is performed in a central surgical theater. The staff of the center performs surgery for all the patients except for specialized procedures such as major vascular and island-flap surgery, which are performed by collaborating departments. Once a week, a compression-stocking clinic with surgical appliance makers and, once a month, a shoe clinic with an orthopedic shoemaker work with the center.

Ward. The ward has 20 beds for wound inpatients, and is equipped for the conditions of the patients, who often are elderly and immobile.

Clinical Activity

Referral. Patients with all types of problem wounds can be referred. Referrals come from both the primary and secondary health care sectors. Patients can be referred to the outpatient clinic, while referrals to the ward must be approved by a physician from the center. The center primarily serves the area of Copenhagen Hospital Corporation, which has a population of 550 000. Referrals from the remaining population of Denmark (5.5 million inhabitants), however, frequently are received.

Initial Visit. The first time patients are seen in the outpatient clinic a complete standardized wound healing record is produced and stored. The record contains the patient's medical, surgical, social, and medication history; results of a complete physical examination; a wound assessment and description; general patient information; diagnostic investigations; and a treatment plan.

Diagnostic Armamentarium. Based on the clinical examination, different types of investigations are used, eg, various types of Doppler scans, ankle-arm index, and toe-pressure measurements. Angiography is used in conjunction with the vascular evaluation. In the United States, transcutaneous oxygen tension is often used as a diagnostic tool in diabetic patients with a falsely elevated ankle-arm index,[15] with values higher than 30 mm Hg indicating adequate tissue perfusion for healing in diabetes.[30] The CWHC

cally dependent. In most centers, the staff work part-time in an outpatient setting with patients who have chronic wounds. In case of hospitalization, the wound patient is referred to a specialized department in dermatology, surgery, internal medicine, or other relevant department, where the knowledge of wound treatment is limited.

For these reasons, centralization and standardization are important issues in wound treatment and care.[22] The ideal concept of a wound healing center should be based on multidisciplinary, well-educated personnel, who work full-time with problem wounds and are able to care for patients with all types of problem wounds during the entire treatment course. The concept should be part of

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uses the toe-pressure measurements as the "gold standard" of the degree of arterial insufficiency.[31-34] Transcutaneous oxygen tension is presently used scientifically but may be a clinical standard in the future.

Improved diagnostic equipment has made surgery a better option for leg ulcer patients. Before surgery a duplex (color) Doppler investigation is performed to investigate superficial as well as deep venous insufficiencies and visualize insufficient perforans.

Treatment and Further Strategy. Patients with minor problem wounds are normally seen only once, whereas patients with more complicated wounds continue to be treated in the outpatient clinic or, eventually, might be referred to the ward. A follow-up program has been established, and the general treatment plans have been published.[35] Algorithms for management of patients with venous leg ulcers and diabetic foot ulcers are shown in **Figure 1** and **Figure 2**, respectively. Pressure ulcers are primarily treated by the primary health care outpatient function, with the principal strategy of relieving pressure and improving the patient's condition.[5,35]

Prophylactic Activity

In the Danish health care sector, Bispebjerg University Hospital has a special role in prophylaxis, and this is also important in the CWHC. The goal is to keep wound patients in their normal environment for as long as possible. Patients with pressure ulcers are often elderly and fragile, so transport to and consultation in the outpatient clinic poses a major stress, creating a high risk for new ulcers. To improve prophylaxis and to decrease the frequency of hospital visits, a primary health care outpatient function organized as a quality assurance project has been established. A full-time nurse from the center assists the personnel in 2 of 13 treatment areas of the primary health care sector in Copenhagen. This system includes telemedicine, which allows the nurse at one of the areas via the Internet send digitalized pictures of the wounds to a physician at the center to discuss the treatment plan. In the future, the intent is to use this outpatient function for patients with all types of problem wounds. The center is also involved in prophylactic investigations directed to better control of blood glucose levels and standardized self-examination of the feet of diabetic patients.

Scientific Activity

In basic research, the focus is on the use of animal and human models and techniques to investigate the mechanisms of the healing process.[36-44] In clinical research, surgery-related[26,33,34,45] wound infections[13,46] and the use of new drugs and bandages[47-49] are top priority.

In quality assurance, 3 areas in particular are of interest: (1) structural problems between the health care sectors in the treatment of problem wounds; (2) models to describe the different types of wounds, their classification, treatment, and prophylaxis; and (3) how to improve the quality of life for patients with problem wounds.

Educational Activity

Internal and external education is ongoing. The results of clinical trials and research achieved in the center are distributed to other areas of the health care system, using the "key-person" model. The center staff educates a specific number of health care workers, who subsequently disseminate the knowledge to the whole health care system.

Wound healing education is included to a minor degree in the pregraduate education of medical doctors. Pregraduate and postgraduate education is provided by the center for all types of health care workers. This has been achieved through internal and external courses and educational day and evening arrangements.

Together with the Danish Surgical Society, the center organizes a specialized postgraduate 3-day course on wound healing problems. Furthermore, a Scandinavian multidisciplinary 3-day course for health care staff working with wound patients has been organized once a year for the last 8 years. The number of participants is limited, allowing intensive discussion. The course is supported by the industry involved in producing wound-related products, and is an example of how the health care system and the industry can work together in an objective way.

In cooperation with the Danish Nurse Association, the center conducts a centralized wound course for nurses entitled "The Longer Postgraduate Course for Nurses Working With Wound Patients." It consists of 4 modules, each lasting for 1 week. Between the modules, the participants have homework, and, at the end of the course, each participant produces a major report on a specific wound problem. The report is graded and is an essential part of the course. The participants obtain a diploma and the certification of "Nurse Specialist in Wound Healing." This allows negotiations for specific employment and increased salary. Based on the achieved experience of the courses, a government-supported diploma education is planned for nurses in wound care.

INTEGRATION OF THE CENTER IN A NATIONAL HEALTH CARE ORGANIZATION

It is vital that an expert function in wound healing becomes an independent and integrated function of a country's national health care system. The function should be based on a multidisciplinary approach, which would become an expert area rather than a specialty. The function in Denmark has been called *clinical wound healing*.

an expert function in wound healing, which is an integrated part of the national health care system.

The idea of a wound healing center in Copenhagen, Denmark, was generated in 1991 after the creation of a professorship related to wound healing. The early center function consisted of a research unit with monthly clinical conferences between senior physicians in different specialties discussing patient cases of problem wounds.[23] General problems in wound treatment and patient care were determined to be lack of standardized treatment and referral plans; lack of multidisciplinary collaboration; lack of evaluation plans of the given treatment; lack of knowledge of health care personnel, patients, and administrative persons; lack of treatment structure for

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Table 1. Classification of Wounds by Cause

Classification	Type of Wounds
Wounds related to changes in vessels	Arterial (ischemic) wounds Venous wounds Lymphatic wounds
Wounds related to neuropathy	Diabetic wounds Alcoholic wounds Other neuropathic wounds
Wounds related to pressure/friction	Pressure ulcer (decubitus)
Wounds related to trauma and surgery	Originally contaminated wounds (surgery related to internal organs) Originally clean wounds (surgery related to bones) Specialized wounds (surgery related to plastic surgery)
Other types of wounds	Anorectal fistulae Stoma-related wounds Specific infection wounds (eg, AIDS*) Neoplastic wounds Vasculitis wounds Other inflammatory wounds Wounds in the oral cavity Self-mutilating wounds Hypergranulating wounds and keloids

*AIDS indicates acquired immunodeficiency syndrome.

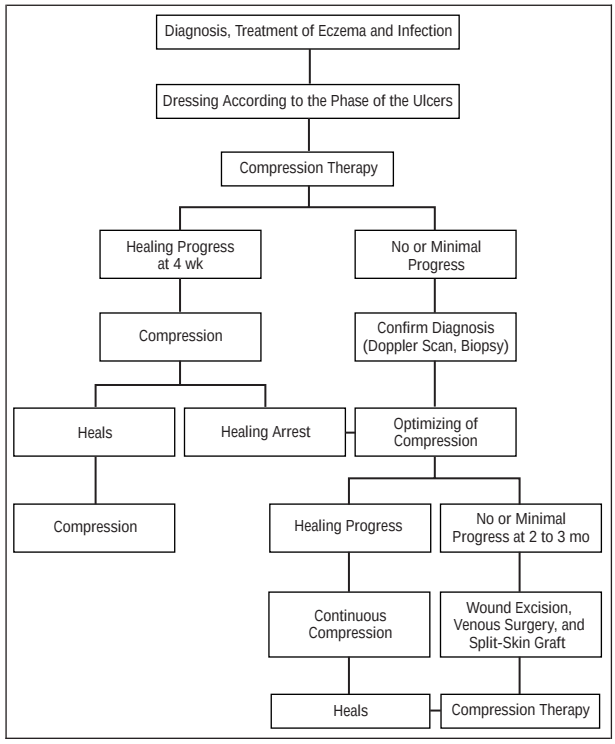

Figure 1. Algorithm for treatment of venous leg ulcers in the Copenhagen Wound Healing Center.

the patients; and lack of basic and clinical research. A simultaneous investigation of the primary health care sector in the central part of Copenhagen documented the following problems[24]: in patients with chronic wound problems, only 51% had a significant diagnostic examination; 40% of patients with expected venous leg ulcers

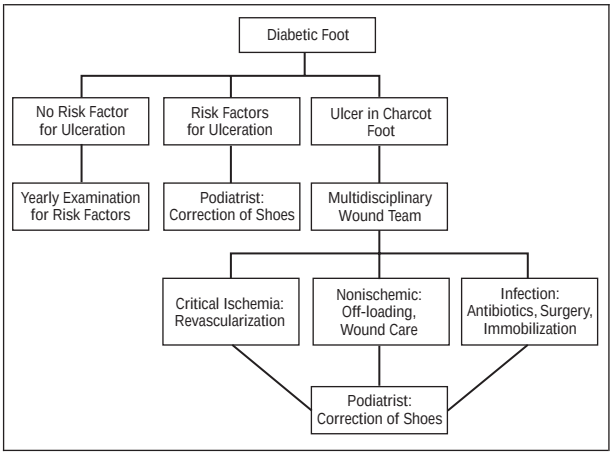

Figure 2. Algorithm for treatment of diabetic foot problems in the Copenhagen Wound Healing Center.

had not been treated with compression; 34% of patients with a foot ulcer were not investigated for diabetes mellitus; and only half of the patients with a pressure ulcer had any specific, organized relieving treatment.

These early conferences resulted in an agreed strategy, which, when implemented, led to an improvement of the healing in more than half the patients classified as "nonhealers."[23] A diabetic foot clinic was simultaneously established at the hospital. Following the introduction of arterial bypass reconstruction in distal pedal arteries and specific local wound care, the number of major amputations was reduced significantly.[25-27] In 1995 to 1996, the structure of the hospital system of central Copenhagen changed from having 7 separate hospitals to having a single central hospital organization (Copenhagen Hospital Corporation) with 5400 inpatient beds.[28,29] The early wound healing center and the diabetic foot clinic joined to form the Copenhagen Wound Healing Center (CWHC) in 1996. The center is an independent, clinical multidisciplinary department that treats all types of problem wounds and is housed in the Bispebjerg University Hospital. Since March 1997, the center has been fully functioning after a stepwise start during the first months.

The aims of this article are to describe the establishment of this integrated wound treatment organization in the Danish national health care system, and to explain how the model might be applicable for both industrialized and developing countries.

RESULTS

CLINICAL ACTIVITY

During the first 3 years of full capacity, 23 802 (approximately 8000 per year or 1400 per 100 000 inhabitants) consultations have taken place in the outpatient clinic and 1014 patients (approximately 340 per year) were referred to the inpatient ward. The distribution of outpatients and inpatients by years is shown in **Table 2** and by causes in **Table 3**. The duration of the wounds was from a few months to several years. The total number of patients treated in the outpatient clinic was 45% of the

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Table 2. Number of Outpatient and Inpatient Consultations

Year	Outpatient Clinic	Inpatient Ward
1997	7921	297
1998	7828	355
1999	8053	362

Table 3. Causes for Inpatient and Outpatient Contacts

Cause	Inpatient Ward, %	Outpatient Clinic, %
Leg ulcers	38	53
Diabetic ulcers	55	39
Pressure sores	1	6
Miscellaneous*	6	2
Total	**100**	**100**

*Acute problem wounds with infection, fistulae, pilonidal sinus, and other rare wounds outside the leg.

total number of consultations for which reason each patient visited the center approximately a mean of 2 times. Of hospitalized patients, 17% to 18% had been hospitalized before. The mean stay at the department was 16 days. Most referrals came from the area of Copenhagen Hospital Corporation (84%), while 16% came from other parts of Denmark.

TYPES OF ULCERS

Leg and foot ulcers in patients without diabetes account for 53% and 38% of treated ulcers in the outpatient and inpatient clinics, respectively. For almost all patients, the wound has been treated several times outside the center without healing. Venous leg ulcers are treated with a standardized conservative regimen, consisting of a local treatment of the wound area and compression bandages primarily with 2 layers. If patients receiving this regimen show no improvement after 3 months, they are offered surgery. Approximately 15% of these patients have isolated superficial venous insufficiency and 85% have deep or combined deep and superficial insufficiency. Occluded deep veins, which are rare, are an absolute contraindication for surgery, but deep or combined deep and superficial venous insufficiency is not contraindicated.

The standard surgical procedure used is excision of the wound and adjacent pathological tissue (lipodermatosclerotic skin), split-skin transplantation, and, if necessary, venous resection and perforantectomy. All patients use compression bandages postoperatively.

Results from the initial 53 patients with nonhealing wounds are shown in **Table 4**. The reasons for recurrence of venous ulcers were infection in more than half the cases, while insufficient compression accounted for one third. Economic analyses have shown cost-effectiveness in cases of no recurrence at 10 months after surgery of venous leg ulcers, in relation to the extra expenses of the surgical procedure (ie, the extra expenses of surgery are similar to the rate of expenses of local wound treatment, dressings, etc, after 10 months).

Table 4. Standardized Surgical Treatment of Initial 53 Patients With Nonhealing Leg Ulcers (Early Results)

Type of Wound	No.	Recurrence Rate, No. (%)*
Venous leg ulcers	21	9 (43)
Arterial leg ulcers	3	1 (33)
Combined leg ulcers	10	6 (60)
Traumatic leg ulcers	8	0
Other causes	11	5 (45)
Total	**53**	**40** (40)

*Recurrence is defined as a new wound (regardless of size) at the place of surgery after 1 year. Only 10% of ulcers recurred to a similar size as before surgery after 1 year.

It was found that 60% of patients with nonhealing wounds were healed 12 months after surgery.

Ischemic Ulcers Without Diabetes

In patients with gangrene after vascular reconstruction or those who did not receive vascular surgery for technical reasons, different types of treatments, such as local resection, vacuum-assisted closure, larvae, hyperbaric oxygen, or induced hypertension, have been used.

Diabetic Ulcers

In the ward, 55% of the patients had diabetes, and this group was the second largest in the outpatient clinic (39%). If vascular surgery was needed, the patients were referred to the collaborating vascular department and returned to the center on day 4 or 5 postoperatively. If vascular surgery was not possible, the patients were treated locally and closely observed for occurrence of ischemia. These patients are offered hyperbaric oxygen treatment. To investigate the treatment outcome, this treatment is organized as a randomized trial. Almost all inpatients with diabetic ulcers are treated by minor surgical procedures (revision, debridement, correction of deformities, etc) using regional anesthesia. Minor amputations (on the foot) were performed in the center, while major amputations (below or above knee) were done by the orthopedic department. A combined use of the described procedures has decreased the major amputation rate for these patients to approximately 20% of that 10 to 15 years ago.[26,27]

Pressure Sores (Decubitus)

In the outpatient clinic, 6% of patients had a pressure ulcer in the hip-sacral region. This low number is a result of the center's policy of treating the patient in the home as long as possible. The primary health care outpatient function has significantly supported this strategy, and the preliminary results seem promising. The incidence of pressure ulcers in Denmark is not known, but probably underestimated. Before starting the outpatient project, the estimated number of persons with pressure ulcers in the area was close to zero. During the first year of investigation, however, 91 patients have been treated for pres-

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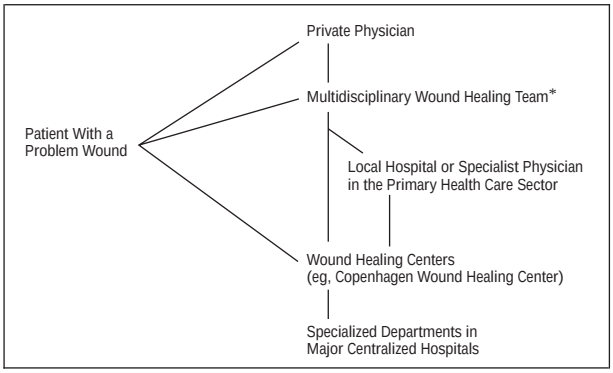

Figure 3. Model for organization of an expert function in wound healing and care ("clinical wound healing"). Asterisk indicates that the multidisciplinary wound healing team includes 1 group for each geographic region in the health care system (in Denmark, for each "amter"), and consists of specialized educated physicians and nurses from both the primary and hospital sectors.

sure ulcers. The number of bed transports to the center has decreased to less than half (40%) after this function started. The need for visits in the outpatient clinic for these patients has consequently decreased.

Other Types of Wounds

Although most chronic problem wounds are treated in the center, many patients with acute surgical wound problems have been treated at the parent unit. The center then assists the staff during the continuous treatment of the patient.

SURGICAL ACTIVITY

During the last 2 years, surgical treatment has continued to increase; 250 surgical procedures using general anesthesia and 270 using local anesthesia were performed.

INSPECTIONS

Inspections of wound patients in other departments have been provided when transport of the patient to the center was impossible. In 1999, a total of 377 inspections were carried out in other departments. Once a week, the center conducts inspections at 2 other hospitals to evaluate patients with problem wounds related to vascular and diabetic problems.

SCIENTIFIC ACTIVITY

Eight full-time researchers (4 nurses), a technician, and several part-time researchers are affiliated with the center. Laboratory facilities have been established outside the center allowing basic as well as clinical research. Laboratory facilities related to the center have now been established. In the center's first year of full operation (1998), research activity resulted in the publication of 25 articles, 18 abstracts, and 51 presentations of scientific lectures. The center has, since its start, been involved in 6 trans-European and several Scandinavian and national clinical projects.

EDUCATIONAL ACTIVITY

There has been increasing educational activity since the start of the center. In 1998, this activity resulted in 46, 34, and 10 educational presentations of medical doctors, nurses, and podiatrists, respectively. The centralized wound course for nurses, "Longer Postgraduate Course for Nurses Working With Wound Patients," has been offered 5 times, with more than 130 nurses having completed the course. At present, a centralized wound healing course for all types of surgeons is being planned as the first phase of more generalized education in wound healing for physicians.

INTEGRATION OF THE CENTER IN A NATIONAL HEALTH CARE ORGANIZATION

A proposal for an expert function (called *clinical wound healing*) has been submitted to the Danish National Board of Health. The plan is based on 2 important issues: organization and classification of a new structure for education of staff to get acceptance as an authorized wound healer. The organization of this function is done in collaboration with the Danish Wound Healing Society, which has 1000 active members in the health care system. Contacts with the national societies of each medical specialty working with wound problems have been established to get a general agreement of the structure of this expert function.

The model for this structure is based on the existing structure of the health care system, but with new elements focusing especially on problem wounds (**Figure 3**). The health care system in Denmark is divided into 14 regions (*amter*), each having a separate economy in relation to health care expenses. It is proposed that in each of these regions (*amter*), a standardized multidisciplinary wound healing team, consisting of a local staff, be established. This has already taken place in some of the regions. The team should be the referral organization for wound patients in the local region and should organize the plans for treatment in the primary sector as well as in the local hospitals. It is expected that with this approach most patients with problem wounds can be healed. However, a few patients will need more specialized treatment in a centralized *wound healing center*. In countries the size of Denmark (5.2 million inhabitants), 1, perhaps 2, specialized center probably will fulfill this need. Since the wound healing teams also take care of diabetic foot problems, the survival of diabetic foot organizations might be secured this way in the future.

An important part of this structure is the *educational plan* for the staff, which includes the following:

- Nurses: A pregraduate and postgraduate education plan is established in the CWHC. The postgraduate education, including the longer postgraduate course, must be extended to develop a specialist nurse function either as a specialist degree or acheiving a diploma from the Danish National Board of Health.
- Physicians: No standardized pregraduate and postgraduate education is established outside the center.

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A 3-level competence model is proposed. *Level 1* is basic education of all specialist physicians. The education is primarily theoretical and should be included in all specialist programs. *Level 2* includes education for physicians in wound healing teams and in specialized hospital departments treating problem wounds. The education is both theoretical and practical. The practical part should last at least 12 months and take place in a specialized wound healing center. *Level 3* is education for specialized physicians employed at wound healing centers. The education has a theoretical and practical part, of which the latter should last at least 24 months. Twelve of these months should take place at a specialized wound healing center, and the remaining months in a selected specialized relevant department for treatment of problem wounds. The theoretical part of levels 2 and 3 includes a specific number and type of courses covering the wound healing area.

When the education has been completed, the physician should receive the degree, "Wound Healing Expert of First or Second Degree," and attain a diploma from the National Board of Health, which provides the graduate opportunities for employment preferences and a higher salary.

COMMENT

Different concepts for the treatment of problem wounds have been created during the last 10 to 20 years. Most models have been based on an outpatient clinic related to a specialized department, such as plastic, orthopedic, or vascular surgery, or dermatology. These clinics usually function 1 to 2 days a week and focus on a specific type of problem wound, such as diabetic foot ulcers, venous leg ulcers, or pressure ulcers. In this article, we have described a new concept of a wound healing center and organization of an expert function in a national health care system. The wound healing center is multidisciplinary and independent of the medical specialty system and organized as a normal university department with both outpatient and inpatient facilities that focus on all types of problem wounds. The CWHC in Denmark is the key element in the national expert function integrated in the Danish national health care organization.

The establishment of CWHC has been a successful venture. The number of referred patients has been significantly higher than expected and most patients have required multiple services of the hospital system. These services have been accomplished in the center regimen due to the multidisciplinary setup. Despite being considered "nonhealers" for years, most patients have had successful healing after being referred to the center. We have reported healing in more than half the cases, when an agreed multidisciplinary strategy was used,[23] and an improvement in patients with all types of problem wounds.[25-27,29]

Little evidence for the healing rate of standard-treated problem wounds is available in Denmark and other countries. The explanation may be that there are no accepted, specific standardized treatment plans. This means that no comparable baseline healing rate for the different types of problem wounds exists. A standardized, accepted treatment plan for each type of problem wound is therefore essential. This can best be provided through a multidisciplinary approach in a national structure that provides generally accepted guidelines.

Using the multidisciplinary center concept described in this article, it is possible to organize standardized diagnostic and treatment procedures and provide guidelines for treatment plans that can become accepted nationally. The structure of the center is comparable to a department of a university hospital anywhere in the world, but different from all types of wound healing centers. This type of center concept should also be able to be accepted as a national expert function in wound healing.

Why choose a full department structure and why treat all types of wounds in such a center concept? The advantages of having a full department containing both an outpatient clinic and inpatient ward and staffed with employees who work full-time with problem wounds are (1) development of standardized treatment plans; (2) access to relevant objective investigative methods and relevant surgical approaches; (3) higher degree of continuity in treatment; (4) treatment plan based on a multidisciplinary assessment; (5) treatment plans at the initial visit; (6) increased patient satisfaction; (7) improved possibilities for education and training of all types of health care personnel; and (8) improved possibilities for basic and clinical research in healing and care of patients.

The idea of treating all types of wounds at the same place is based on the following considerations: (1) wound treatment, especially provided locally in the wound area, is similar for all types of wounds; (2) the staff learns the natural history of all types of wounds; (3) treatment plans for different types of wounds will be identical; (4) the resources and the diagnostic and treatment armamentarium will be used optimally; (5) focusing on all types of wounds allows an independent national expert function to be established; (6) status of all types of wound treatment is increased; (7) secure education is attained; and (8) cost-effectiveness of treatment is maximized.

CONCLUSIONS

This article describes a new concept to organize treatment of wounds locally and nationally. A wound healing center consisting of an independent, multidisciplinary department integrated in a national expert function is beneficial to patients and society. A setup with personnel working full-time with all types of problem wounds improves the compliance and continuity of treatment and care and provides access to relevant diagnostics and therapeutic measures. Also, the possibilities for education of health care personnel, as well as research, are improved. This model, with minor adjustments, may be applicable for both industrialized and developing countries.

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