



European Practice Guidelines for Burn Care

(Minimum Level of Burn Care Provision in Europe)

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with contribution of other members of the Executive
Committee
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(EBA)

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PART I.

Minimum Level of Burn Care Provision in Europe

1. Foreword

Clinical practice guidelines (CPG's) are currently a regular part of a clinician's armamentarium in virtually all branches of medicine. These guidelines are constantly upgraded and expanded through the work of physicians around the world. CPG's in burn medicine also play an important role in successful burn treatment. European Burns Association (EBA) and namely its Executive Committee recognize the value of CPG's, but have identified duplicity and varying levels of quality in the different national and other **Practical Guidelines for Burn Care**.

Europe is a continent moving towards the unification of virtually all aspects of life, including medicine and burn care. Open borders allow European citizens to move freely between countries. In the same respect, health care personnel are seeking employment in countries other than where they have received their training. This brings into question the quality of education received in the home country in relation to the established level in a different country. In the case of injury or illness in a foreign country, European citizens may find themselves in a medical facility which does not meet the standards of their home country. This is a pressing issue among patients, insurance companies and national health care authorities.

This is the driving force behind the development of **European Guidelines for Burn Care Provision** which will recommend, among other things the **Minimum European Level of Burn Care Provision**.

Guidelines for Minimum European Level of Burn Care Provision could become an important tool in improving burn care in Europe.

A lot of work has been done by EBA to create and have these guidelines approved, especially after the appearance and success of the American Burn Practice Guidelines in the year 2001.

For this purpose EC EBA has established the special Guidelines Committee which – together with the Executive Committee is dealing with this extensive and difficult task.

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Both these bodies would like to express their gratitude to all, contributing to the process of creating the **European Practice Guidelines for Burn Care** and invite all being involved in Burn Care and/or being interested in this topic to co-operation and expression of their opinions.

Minimum European Level of Provision (Delivery) of Burn Care could be an important tool of improvement of Burn Care in Europe.

I would like to express my special thanks to the whole PAM working group for the hard and efficient work on this document:

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2. Background

2.1. Introduction

Clinical Practice Guidelines (CPG's) for various medical fields first appeared in publications in the early 1990's. CPG's offer structured and highly qualified reviews of relevant literature, giving physicians the best available information gained from concrete clinical studies to improve treatment (evidence based medicine – EBM).

This concept has proven to be very useful and currently thousands of CPG's exist for a wide range of medical branches. CPG's have contributed significantly to the upgrading of many medical strategies and work is being done to further improve these guidelines.

At present "Guidelines or Recommendations" work with 3 categories of evidence and suggestions:

1. Standards
2. Guidelines
3. Options

2.1.1. Standards are generally accepted principles of treatment based on a very high degree of clinical certainty supported by Class I evidence (based on prospective, randomised controlled clinical studies)

Standards are rigorously applied rules. Some European countries have their own approved standards for some steps in clinical burn treatment.

2.1.2. Guidelines are strategies of treatment based on moderate clinical certainty supported by Class II evidence (retrospective studies with relatively clear results).

Guidelines should be followed and only broken if medically justified.

This level of clinical certainty (Class II evidence) is much more frequent and accessible.

(Unfortunately, the word Guidelines is used in a more global sense for all 3 kinds of recommendations and also in a more specific sense for this middle category. This is unfortunately misleading, but routinely used.)

2.1.3. Options are possible ways of treatment based on personal clinical observation and/or Class III evidence (clinical series, case reports, expert opinions, etc.)

Options should be put through future clinical studies.

2.1.4. General outlining of the European Guidelines for Provisional Burn Care

When speaking about the Practice Guidelines for Provisional Burn Care, the following questions should be answered:

- 1. What is burn injury and burn care in general?**
- 2. Where should burn care be provided?**
- 3. Who should be the subject providing burn care?**
- 4. Who should be the object of burn care?**
- 5. How should burn care be provided?**
- 6. Which European countries are involved?**

These questions will be discussed in the following chapters. There is more interest in the category **Organization of Burn Care delivery (where it is done, who is the object and who is the subject of the burn care)** than the others. Therefore, Definition of a Burn Centre and the Transferral Criteria to the Burn Centre are explained in detail.

There is an explanation for this fact. Whereas evidence based basal steps in burn treatment are the same in all over the world, the organisation of delivery differs regionally. Consequently, EBA EC Committee will propose its own recommendations.

They should be used as guidelines for classification of medical facility as a burn centre, thus fulfilling the recommendations of the European Burn Association.

2.2. Burn injury and burn care in general

A **Burn** is a complex trauma needing multidisciplinary and continuous therapy.

Burns occurs through intensive heat contact to the body which destroys and/or damages human skin (thermal burns).

In addition to thermal burns, there are electric, chemical, radiation and inhalation burns. Frostbite also comes under this category.

Burn Care is the complex and continuous care for burn patients.

- The main goal of this care is to ensure optimum resuscitation in the emergency period and then to reach re-epithelialization of injured or destroyed skin either by support of spontaneous healing or by surgical necrotomy and grafting with STSG. Subsequent treatment is to ensure the optimum postburn quality of life.
- Burn care includes thermal as well as electric and chemical burns. Inhalation and radiation injury and frostbite also comes under this category.
- Developments over the last several decades have clearly shown that burn care treatment offered in specialised burn centres brings better results than in non-specialized centres.
- Through the gathering of experience and critical evaluation of relevant literature, recommendations have been made to facilitate the optimum delivery of burn care including specific diagnostic and therapeutic procedures.

Burn treatment as part of burn care aims to provide:

- 1. first aid**
- 2. pre-hospital care**
- 3. transportation to an appropriate medical facility**
- 4. management of the emergency period (resuscitation)**
- 5. renewal of damaged and destroyed skin in acute periods**
- 6. prevention and treatment of all complications**
- 7. main surgical reconstruction**
- 8. somatic and psychosocial rehabilitation**

2.3. Burn care provision

(Recommendations for European minimum level of Provisional Burn Care)

The most important aspects of Burn Care Provision can be concentrated into two definitions:

- 1. The burn centre**
- 2. Transfer criteria to the burn centre**

These two topics are elaborated in detail.

2.3.1. The Burn Centre

The Burn Centre is an organized medical system for the total (complex and continuous) care of the burn patient. It is the highest organized unit among the Burn Care facilities.

The Burn Centre:

- 1. Has appropriate spaces and spatial arrangement**
- 2. Is situated inside a hospital**
- 3. Is properly equipped for all aspects of the treatment of burn patients.**
- 4. Treats adults and/or children with all kinds and extents of burns.**
- 5. Includes a medical staff and an administrative staff dedicated to the care of the burn patient.**
- 6. The Burn Centre is the highest form of Burn Care Facility**
- 7. Sustains a very high level of expertise in the treatment of the burn patient.**
- 8. Conducts a certain minimal number of acute procedures and consequent reconstructive surgical procedures per year.**

2.3.1.1.

Burn Centre space and spatial arrangement

- Should have access to an operating room with at least 42 m², air conditioning, preferably laminar air flow and wide range temperature settings for acute surgical burn treatment.
- This operating room is equipped with all the needs for burn surgery and a respiratory assistance service on a 24-hour basis.
- A second theatre should be devoted to secondary burn reconstruction.
- Should have at least 5 acute beds specially equipped and designed for the care of a major burn patient, i.e. high room temperature, climate control, total isolation facilities, adequate patient surveillance, intensive care monitoring facilities, etc.
- Have an established current germ surveillance program.

- Include enough regular beds in the adult and/or children 's wards to meet current needs.
- Have enough specialised and equipped spaces for rehabilitation and occupational therapy.

2.3.1.2.

Burn Centre situated inside a hospital

- Should maintain or at least have access to a skin bank.
- Must have easy access and cooperate with other departments, especially with Radiology, Microbiology, Clinical Biochemistry, Clinical Haematology, Immunology, Surgery, Neurosurgery, Internal Medicine, Neurology, ENT, Ophthalmology, Gynaecology, Urology, Psychiatry etc.

For these reasons, a Burn Centre should be situated inside the largest hospitals in each country.

2.3.1.3.

Is properly equipped for all aspects of the treatment of burn patients

The Burn Centre has equipment of sufficient quality and quantity for specialized burn care. This includes instruments currently found in surgical operating theatres, Intensive Care Units and Standard Care Wards in addition to specialised knives (Humby, Watson...) and dermatomes (either electric or air driven) mesh and or Meek dermatomes, etc.

2.3.1.4.

The Burn Centre includes a medical staff and an administrative staff dedicated to the care of the burn patient.

The main features of the Burn Centre Personnel (Staff) are as follows:

The burn centre director (chief of staff, leading burn specialist)

- A medical specialist dedicated to and experienced in burn treatment, familiar with all aspects of complex and continuous burn care (with at least 10 years of clinical practice), taking responsibility for all activities at the Burn Centre.
- Formal education typically is: plastic surgeon, general surgeon, anaesthetist or intensivist. Surgical background is preferred, as the causal treatment of severe burns is done with surgery, but an intensivist with some surgical training and education is also acceptable.

The burn centre director (chief of staff, leading burn specialist)

- Typically, a post-graduate education lasting a minimum of 5 years.
- 2 years basal education in surgery (22 months in a surgical department, 2 months in an internal department.
- 3 subsequent years in a burn centre (including 1 year in a department of plastic surgery, 2 months in a department of anaesthesiology and intensive care for children/adults.
- After certification, another 5 years working in a burn centre is recommended.

Staff physicians

- Staff physicians must have a high level of expertise in burn treatment. This can be attained through two years of instruction in a burn centre which follows basic practices in surgical and internal skills. In centres treating children, paediatricians (incl. paediatric surgeon) must also be present.
- A burn centre must have at least one full time burn care surgeon (specialist) and one anaesthetist available in the centre on a 24-hour basis.
- The minimal number of staff physicians is one per 2 intensive care beds.
- Acute surgical burn wound treatment is provided by the team recruited from the burn centre staff. This team must

always consist of a burn surgeon plus 2 to 3 paramedics and an anaesthetist with his/her nurse.

- During surgery, at least one fully accredited burn specialist must be present in ICU.

Staff nurses

- Should be led by a registered nurse with years of experience in burn care in a burn centre, also possessing managerial expertise.
- Patients should have 24 hour access to a registered, highly skilled nurse experienced in the care of burn patients.
- The centre should be equipped with a sufficient amount of nurses to meet modern standards of care of burn patients. At least one nurse per patient on a BICU bed.
- Nurses should be able to handle all types and degrees of severity in burn and critically ill patient cases, different types of cutaneous wounds and ulcers and all aspects of primary rehabilitation.

Rehabilitation Personnel

- Burn centres should have permanently assigned physical and occupational therapists in the burn team.
- Rehabilitation personnel should have at least one year of experience in a burn centre.
- Rehabilitation personnel should deal with both in and out patients.

Psychosocial Work

- Burn centres should have a psychologist and a social worker available on a daily basis.

Nutritional Services

- A burn centre should have dietician service available for consultation on a daily basis.

Other Staff Members

- Specialists cooperating closely with the burn team but not necessarily being on staff:
general, orthopaedic and cardiothoracic surgeons, neurosurgeons and neurologists, internists, ENT specialists, ophthalmologists, urologists, gynaecologists, psychiatrists, radiologists, biochemists, haematologists, microbiologists, immunologists and epidemiologists.

Having a well-educated and trained burn centre staff, along with appropriate space arrangement and medical equipment, is the key factor in improving burn care and its outcome.

Because of extreme importance of PAM (professionals allied to medicine) for the complex burns treatment, their Clinical Guidelines are included as the separated part of this document.

2.3.1.5.

The Burn Centre is the highest form of Burn Care Facility

Lower organisation units other than a Burn Centre are:

1. Burn Unit
2. Burn Facility

These facilities provide only some aspects of Burn Care and are present in virtually all European countries. They are typically affiliated to surgical or paediatric departments and a unified European definition is currently not possible. Severe burn patients, as defined in the next chapter, should not be referred to Burns Units and/or Burns Facilities for definitive treatment.

2.3.1.6.

The Burn Centre sustains a very high level of expertise in the treatment of burn patients

To ensure the current high level of training and expertise in the treatment of all aspects of burns, the following items should be adhered to by a burn centre:

2. Provide complex and continuous burn care.
3. Be involved in teaching and research activities in addition to diagnostic and therapeutic activities.

2.3.1.7.

Conducts a certain minimal number of acute procedures and follow up reconstructive surgical procedures per year.

- A burn centre should admit at least 75 acute burn patients annually, averaged over a three-year period.
- A burn centre should always have at least 3 acute patients admitted in the centre, averaged over a three-year period.
- A burn centre must have in place its own system of quality control.
- A burn centre should perform at least 50 follow-up reconstructive surgical procedures annually.
- In Europe, one burn centre is advisable for every 3 -10 million inhabitants.

2.3.1.8.

Burn Centre treats adults and/or children with all kinds and extents of burns.

2.3.2. Transferral Criteria to a Burn Centre

It is very important to identify the patients who should be referred to a burn centre.

Patients with superficial dermal burns on more than:

- 5% of TBSA in children under 2 years of age
- 10% of TBSA in children 3-10 years of age
- 15% of TBSA in children 10-15 years of age
- 20% of TBSA in adults of age
- 10% of TBSA in seniors over 65 years of age

In addition:

- Patients requiring burn shock resuscitation.
- Patients with burns on the face, hands, genitalia or major joints.
- Deep partial thickness burns and full thickness burns in any age group and any extent.

- Circumferential burns in any age group.
- Burns of any size with concomitant trauma or diseases which might complicate treatment, prolong recovery or affect mortality.
- Burns with a suspicion of inhalation injury.
- Any type of burns if there is doubt about the treatment.
- Burn patients who require special social, emotional or long-term rehabilitation support.
- Major electrical burns
- Major chemical burns
- Diseases associated to burns such as toxic epidermal necrolysis, necrotising fasciitis, staphylococcal scalded child syndrome etc., if the involved skin area is 10% for children and elderly and 15% for adults or if there is any doubt about the treatment.

3. Countries currently considering participation in the clarification of European Guidelines for Burn Care

The following European Countries and their population of over 500 million inhabitants are considering involvement into the clarification of European Guidelines for Burn Care:

Portugal	The Netherlands	Czech Republic
Spain	Luxemburg	Slovakia
France	Germany	Hungary
Ireland	Switzerland	Slovenia
UK	Austria	Serbia
Iceland	Italy	Croatia
Norway	Estonia	Bosnia and Herzegovina
Sweden	Latvia	Greece
Finland	Lithuania	Romania
Belgium	Poland	Bulgaria

These countries, with the exception of Switzerland, are either members of EU or EEA (EFTA), or will soon be joining one of these groups. In any case, these countries are already cooperating in the exchange of burn information.



The situation at present is unclear in several countries, which geographically are situated in Europe, but their level of cooperation, data exchange and/or other factors do not allow their involvement in the System of European Guidelines for Burn Care. These countries are Belarus, Ukraine, Moldova and Albania.

4. Conclusion

Presented statements do not, of course, have the form of standards and/or guidelines as mentioned at the beginning of this document. They must be “translated” or “converted” into the form of true standards and/or guidelines. Nevertheless, this process is quite sophisticated, expensive and time consuming, that’s why this article may be interesting for those involved in burn care in Europe.

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PART II

CLINICAL GUIDELINES

FOR PROFESSIONS ALLIED TO MEDICINE (PAM)

**Devised by the PAM Committee of the European Burns
Association**

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SECTION 1 INTRODUCTION

Best practice in burn care is achieved through a multi-disciplinary – multi-professional team which meets on a regular basis to assess patients' needs, set objectives and plan treatment interventions, within a bio-psychosocial model of care.

Burn care should be co-ordinated with the aims of providing optimal quality of care and achieving best quality of life for burn injured patients

BACKGROUND / EVOLUTION OF GUIDELINES

In 2002, a 'State of the Art Symposium' was held in Copenhagen to commence working on producing 'General Guidelines for Burn Care'.

The PAM committee acknowledged the need for the development of 'evidence based guidelines' for Professions Allied to Medicine, but were aware of the enormity of undertaking such a task.

A decision was made to produce basic guidelines /recommendations for practice, to be used as working documents, and based on evidence of best practice.

The committee looked at various sources of guidance for developing guidelines:

- British Burn Care standards
- Practice guidelines for Burn Care – ABA
- Principles and Management Guidelines for O.T. / P.T. – ANZBA
- O.T. / P.T. Professional bodies – 'Guidance on Developing Clinical Guidelines' (UK)

To date the committee has produced a number of guidelines / recommendations related to nursing, therapy and psycho-social issues. It is anticipated that the committee will continue to work on producing further guidelines to complement those included in this manual

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OBJECTIVES OF GUIDELINES

- To provide a tool to assist with clinical decision making
- To provide a practical guide regarding the relevant clinical intervention techniques required for effective patient management
- To make recommendations based on research evidence
- To promote a consistent approach to best practice for PAMS within Europe working with people who have sustained burn injuries

DISSEMINATION AND IMPLEMENTATION

- Presentation of guidelines to Pam professionals at EBA congress for discussion & feedback
- Posting of guidelines on PAM section of EBA website
- Recommendations for trialing of guidelines

SECTION 2 PAM ORGANIZATION.

PAM stands for Professionals Allied to Medicine, which encompasses several different professions such as nurses, physiotherapists, clinical psychologists, educational and play therapists, speech therapist, dieticians, social workers, occupational therapists, ergotherapists, and others. Close liaison with other members of the team is essential as roles may overlap and vary from center to center, and from culture to culture.

Each burn unit will have PAM's assigned to the burn team. Members of the burn team will be experienced in burn treatment. Each member of the team must work in accordance with the guidelines defined in cooperation with the medical direction.

As the ideal burn unit is inserted in a general hospital, some of the PAM professional may be affiliated to the burn unit on a consultant basis. Best practice in burn care is achieved through a multidisciplinary-multiprofessionnal team which meets on regular basis to assess patient's needs, set objectives and plan treatment interventions within a biopsychosocial model of care.

Burn care should be co-ordinated with the aims of providing optimal quality of care and achieving best quality of life for burn injured patients.

The staffing has to be in accordance with the local legislation. However to fulfill the high level of needs for best patient care, additional resources would have to be set up. A shortage is identified as a source of adverse patient outcome. Some instruments for staffing evaluation are developed and sensitive to the specificities of a burn unit.

Nursing

In the burn unit staffed with a sufficient amount of nurses to meet modern standards of care the burned patient will have access to a highly experienced nurse, all-around 24-hours.

This specialized nursing staff will be able to handle all types and degrees of severity of burned patients, critical ill patients, different types of cutaneous wounds and ulcers and rehabilitation. These specific competencies will be regularly trained and updated. Pediatric burn care requires the availability of pediatric nurses.

The nurses screen the patient's needs on a holistic approach and if necessary refers to other specialists. Specialized nursing plans based on a defined philosophy (eg. V.Henderson) will be developed and nursing procedures will be written and regularly reviewed.

Dieticians

The dietician will regularly visit the patients to evaluate the nutritional needs (using different formulas), to set the menus and to stimulate the anamnesis by the nurses, evaluating the accordance between real intakes and needs. There should be an individualized adjustment to the patient's clinical situation. The dietician will have contact with the MD for suggestions (TPN, trace elements...)

Physiotherapists.

The main aim of physiotherapy in burns is the most possible mobility function, independence and performance after the injury. To achieve this, physiotherapy must be begun in the very early - acute - phase of burn care (ICU), and must focus on the support of the cardiorespiratory system, oedema reduction, decubitus prophylaxis, prevention of burn scar contractures. Later, or rather parallel it comes to scar prevention/scar management, preserving and/or increasing the range of motion and muscle strength, increasing of tissue elasticity. Interventions: respiratory physiotherapy, positioning, moving through full range daily, splinting, soft tissue mobilization, isometric exercises, assisted active and active exercises, stretching, gradual mobilization, balance and coordination training. Psychological support, strength and endurance training, is needed for an effective physiotherapy, so as regular consultations. In children, family/parents instruction and education and their most possible involvement in the PE of the burned child is especially needed, beside regular consulting, so to ensure the continual PE of the child, even after discharge.

Clinical psychologists

The psychosocial dimension of the burn patient is a complex and fundamental component of the recovery and adjustment process which needs to be addressed as part of the standard clinical care for patients during hospitalization and after discharge.

The role of the clinical psychologist is to provide individualized psychosocial care fitted to patients' and family needs within the multidisciplinary health care team goals; psychological assessment and psychotherapeutic interventions aimed at preventing and/or reducing negative emotional reactions, promoting compliance with care and psychosocial adjustment and well-being; assist health care team in managing patients and families.

Social workers

The main areas of responsibility of a social worker involved in the burn team are (1) ongoing monitoring of patient and family social needs; (2) assessing, supporting and developing the coping skills of the burn patient and family (3) facilitating communication between staff and patient and family; (4) co-ordinating/encouraging commitment of resources (family,

friends, outside supporting agencies/organizations); (5) networking of support systems for patient; (6) financial aspects and issues of employment, relationships.

Occupational therapists

The main aim of the Occupational Therapist in burns is to maximise function - both physical and psychological, maximise independence, and facilitate return as much as possible to previous life roles at home, work and leisure.

The Occupational Therapist is involved in the assessment and practice of personal and domestic activities of daily living, and may include the provision of specialised aids and equipment to increase independence. Home assessment may be required to assess the patient's ability to return home and to arrange adaptations to the home / support services if required.

The Occupational Therapist may be involved in the provision of splints (orthoses) both in the early stages and post surgery, to assist in maintaining anti-contracture positions and prevent deformity / contractures.

SPEECH THERAPIST

A speech therapist involved in a burn team could help to prevent, assess and treat communication and swallowing disorders arising from burn and inhalation injuries, such as expressive and receptive language disorders, articulation disorders, fluency and voice disorders, problems of swallowing and feeding. He/she also can assist in facial contracture prevention and treatment and the patient's transition from parenteral to oral nutrition. Education, consultation and instruction of the patient and family is also offered.

Others

In the future other therapists giving answers to new problems will be included in the team.

Pediatric care

For burn units accepting children there should be available additional resources, namely specialized professionals to deal with pediatric care

Education and information of parents/caregivers is of utmost importance. Care should be performed in close collaboration with them. Before discharge, education of parents/caregivers on care to be provided is recommended.

Educational therapist.

Education of children in burn units/centres needs to be facilitated by the hospital in order to preserve normality, positive activities, emotional adjustment, developmental needs, particularly during long hospital stays.

To maintain a high quality of care a continuous training of all these professionals is mandatory on a regular basis as burn care covers a wide range of activities and situations.

Multidisciplinary meetings are recommended on a weekly basis in order to review patients' biopsychosocial status, set goals and coordinate treatment and care actions.

Attention should be paid to discharge modalities aiming at continuing of care despite transfer to step down unit or home. A care coordinator may facilitate following the patient during his care course, making connection within all the partners even when patient is at home. Specific reintegration programs should be utilized in this process

Each profession will develop contact with external caregivers to make sure that the patient receives the right treatment when at home. If necessary, PAM consultations could be set up.

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SECTION 3 NURSING GUIDELINES

NUTRITION

Recommendations:

It is recommended that the nurses have an understanding of the rationale for patients' nutrition and collaborate with the burn team to ensure the patient has correct feeding.

She (He) will cooperate with the MD to define / evaluate the amount of needs.

The final aim is sufficient nutrition for wound healing, considering the limits of the daily care (fasting, pain, sleep)

Regular evaluation is mandatory.

Considerations:

The nurse should:

Understand the principles underlying nutrition

Find the best way to feed the patient, even in combination with other alternatives (IV-GS – PO)

Plan the delivery

Plan evaluation by some means (co-operation)

Keep informed of the latest developments regarding nutrition

Audit tools

Scales

Daily (regular) weighing of the patient

Blood samplings (PS-Albumin)

Supporting evidence for recommendations.

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PAIN MANAGEMENT

RECOMMENDATIONS

- Burn pain should be managed by using a guideline-based approach.
- All burn centres should have a multi-disciplinary approach to the treatment of burn pain.
- Preferably, patients have an individualized pain management plan based on their individualized pain scores.
- Pain should be sub-scaled in: acute pain, procedural pain, and breakthrough pain
- Pain should be measured with reliable assessment scales validated for the different age groups who attend a burn centre.
- Pain assessment, including (pain-related) anxiety, add to complete documentation of the patient's pain which in turn contributes to adequate pain management.
- Health care professionals should understand the principles of analgesia and the importance of delivering the right drugs at the right time.
- Health care professionals should be acquainted with non-pharmacological pain interventions.
- Health care professionals should be aware that the punctual compliance with the pain management plan, addressing background pain, procedural pain, and anxiety is a necessary condition for adequate pain management.
- Health care professionals should be made aware that pain assessment by means of validated scales is a conditio sine qua non, as evidence emphasized that care givers (e.g. nurses) are not able to give a reliable estimation of the patient's pain.

CONSIDERATIONS

- Guidelines for burn-pain management must be broad in scope to allow for variations in analgesic needs across all patient populations and phases of burn recovery.
- Nurses should continuously and accurately assess the patient's pain and the response to therapy.
 - Medication, especially opioids, should be regularly evaluated and adjusted to achieve maximum effect and minimal side effect.
- The nursing role is the most important in the essential focused surveillance of burn pain and its successful treatment
- Even minor burns are painful and need analgesia.
- Aggressive pain management should be used in the first instance.
- Analgesia should be administered prior to dressing change (1/2 to 1 H).
- Consider anxiolysis in addition to pain medication.
- For the relief of itching antihistaminic drugs can be added.
- The aim should be for the patients to be awake and alert but comfortable.

- Non-pharmacological management of pain, such as active hypnosis, rapid induction analgesia and distraction relaxation may be considered in adjunction to pharmacological therapy.

AUDIT TOOLS:

- Pain scales such as VAS, are commonly used in adult patients in burn care practice, although there is currently no Class I evidence to support the use of any of the yet known pain assessment tools in burn patients. Nevertheless, there is convincing evidence in other patient groups that the VAS is a reliable and valid measure for the assessment of pain.
- Observational behavioural pain assessment scales should be used to measure pain in children aged 0 to 4 years.
- Faces pain rating scale can be used in children aged 5 years and older.
- VAS can be used in children aged 12 years and older.
- WHO guidelines for combination of step one to three pain killers (WHO Pain ladder).

SUPPORTING EVIDENCE :

In general, there is growing evidence that pain management protocols should be tailored to the individual needs of the patient (Ratcliff et al., 2006). Pharmacological interventions should therefore be fine tuned to the patient's situation and fluctuations in time. Regularly repeated pain assessments can assist in meeting this aim. Next to it, non-pharmacological pain interventions become a necessary adjunctive intervention in the battle to overcome (procedural) pain. The current best available evidence was found for active hypnosis, rapid induction analgesia and distraction relaxation (de Jong et al., 2007). Nevertheless, there is preliminary evidence that also non-pharmacological interventions should be adapted to patient characteristics (e.g. coping style or personality characteristics) (Van Twillert et al. In Press).

A necessary condition for individualized pain management protocols is the measurement of pain. Although in burn care there is a need for validation studies especially in young children, studies in other patient populations showed that observational behavioural pain scales can provide insight in pain experienced by very young children (von Baeyer and Spagrud, 2007). Reports of current practice (Ratcliff et al., 2006) and a validation study (de Jong et al., 2005) show that this type of scales has been introduced in burn care practice in latest years.

Finally, guidelines are necessary because studies show that information and education alone have little effect on the quality of pain management.

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<http://www.who.int/en/> WHO's pain relief ladder

FLUID RESUSCITATION

GUIDELINE STATEMENT :

- Proper fluid management is critical to the survival of patients with extensive burns
- Fluid resuscitation needs are related to the extent of the burn and body size.

CONSIDERATIONS :

- To prevent hypovolemia and/or burn shock the nurse, in collaboration with the physician, will initiate as soon as possible a safe and accurate fluid resuscitation (if indicated).
- The effects of the fluid resuscitation on the hemodynamic status of the patient should consistently be assessed.
- Titrate Ringers Lactate based on urine output.
- Urine output should be monitored frequently
- Target values of urine output are: 0,5 cc/kg/hr for adults, 1cc/kg/hr for children <30kg and 1 to 2 cc/kg/hr for high voltage burns.
- No colloids are given the first 8 hours after burns.
- Administer maintenance fluid with resuscitation due to limited glycogen stores in young children.

AUDIT TOOLS :

- Accurate TBSA measurements using Lund & Browder tables and/or rule of nines schedule.
- Patient's palmer surface (hand + fingers) = 1% TBSA
- Parkland Formula for fluid resuscitation in burns

SUPPORTING EVIDENCE :

- Evidence based studies on fluid resuscitation in the literature are numerous.

WOUND CARE

AIMS in WOUND CARE:

- Fast wound closure with optimal functional and aesthetic result
- Preventing infection Sepsis, SIRS, MODS... and, or biofilm formation resulting in less inflammation, better scarring and finally less morbidity and mortality.
- The end result of any wound management will be an expedited wound healing with maximum patient comfort

HOW ACHIEVING IT?

- By creating the optimum wound environment to enhance wound healing with the use of topical treatment or surgery and hereby seeking for a balance of nutrition, hypoxia, and removal of debris in an occlusive moist environment, with a minimum of psychological stress and pain to the patient.

EVIDENCE

- Wound toilet or wound bed preparation are seen as the first step in local treatment of both acute and chronic wounds¹. It consists in the removal of slough, non vital tissue and necrosis by abundantly cleaning and cleansing the wound with tap water (filtered), saline solution or sterile water in combination with mechanical debridement². It results in bacterial load reduction.
- Use of disinfectants may induce allergic reactions and or irritation, therefore they might even slow down healing. Moreover they have a reduced action in wounds due to proteins, present in the wound bed. There is low evidence concerning the use of disinfectants³.
- Wounds heal faster in a moist environment, it accelerates the breakdown of fibrin and death tissue and prevents cellular dehydration and cell necrosis. It fastens angiogenesis and collagen synthesis and strengthens the interaction between growth factors and target cells. A moist wound environment is less painful, has less infectious risks and finally reduces the costs of care^{4,5,6}.
- The use of prophylactic systemic antibiotics are not supported by evidence⁷

RECOMMENDATIONS

- Topical treatment
Dressings: The choice of dressing depends on: cause, size, depth, location, degree of exudation, contamination level and costs. So reflect before use and be creative because there is no clinical directive evidence to support the choice of one dressing over another⁸.
For secondary healing wounds there is limited evidence that foam dressings have an advantage for patients satisfaction, pain reduction and time of care^{9,10}

Topical creams: Should have good antimicrobial effects without the risk for resistance or allergic reactions. They should leave no slough on the wound bed and provide good visibility on the wound bed. They should not dehydrate the wound and on the other hand absorb enough exudates to keep the balance for moist healing without maceration of the surrounding (intact) skin.

- Blisters: clinical guideline for best practice based on available evidence
Conflicting recommendations and clinical applications have been given concerning best practices for the management of burn blisters associated with partial-thickness burns. Arguments for the preservation of intact blisters center on the idea of naturally occurring biologic protection whereas the debridement of blisters has been advocated because of the perceived decreases in wound infection and complications. Recurring themes in burn wound management that are considered in this debate include infection, healing, functional and aesthetic outcome, patient comfort, ease of dressing care, and cost efficiency. The management of burn blisters should be supported by evidence across these six categories, should match the expertise of the provider, and should use the available resources in the practice setting¹¹.
- Stress and delayed wound healing
There is evidence to support the relationship between stress and wound healing in different types of wounds. Stress can affect the healing process both psychologically and physiologically. As wound pain can contribute to psychological stress, measurement and successful management of wound pain could help minimize stress in patients and thus promote faster healing of acute and chronic wounds¹².
- Wound -tissue temperature
Wound-tissue temperature should be kept above 33°C. Below this temperature fibroblast and epithelial cell activity decreases. The time required by hypothermic cells to resume mytotic cell division should not exceed 3 to 4 hours. Wound bed temperature should be maintained as much as possible during dressing changes in order to maximize healing. Time and frequency of dressing changes should be adapted to this knowledge¹³.

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SECTION 4 THERAPY GUIDELINES (PHYSIOTHERAPY & OCCUPATIONAL THERAPY)
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OEDEMA MANAGEMENT

RECOMMENDATIONS:

It is recommended that the therapist collaborate with the burn team to minimise oedema formation and to assist maximum oedema reduction. The Therapist should employ suitable oedema reduction techniques to reduce pain, stiffness and contracture. These may include:

- Positioning, compression & mobility rationale associated with oedema reduction
- Fabrication of devices for patient positioning to reduce oedema eg. foam, thermoplastics, neoprene
- Design of programmes for joint & limb active / passive movements to minimise stiffness and contractures

CONSIDERATIONS:

The therapist should:

- Understand the principles of vascular & lymphatic circulation
- Be aware of predisposing factors to oedema formation
- Be able to assess and grade the type & stage of oedema
- Be aware of the principles of compression application, and competent to select, monitor & review levels of compression
- Be aware of the contraindications for compression application

AUDIT TOOLS

- Visual observations
- Palpation
- Circumferential measurements
- Volumetry
- Goniometry & Range of motion
- Dynamometry
- Muscle strength
- ADL assessment

SUPPORTING EVIDENCE FOR RECOMMENDATION

Oedema control – clinical based consensus

SPLINTING & POSITIONING

RECOMMENDATIONS:

It is recommended that the Therapist have an understanding of the rationale for splinting, and implement an appropriate splinting regime to prevent contracture formation, damage to anatomical structures and assist graft or skin substitute and /or wound closure.

The therapist should assess positioning requirements and implement a safe & timely positioning programme for the burns patient throughout the recovery period. This should include fabrication of devices for positioning where appropriate

CONSIDERATIONS:

The therapist should:

- understand the principles underlying splint design and fabrication
- Apply mechanical and design principles during fabrication & application of static & dynamic splints
- Be aware of the contra-indications, risks and complications associated with splinting
- Be aware of burn pathology and its relevance to positioning requirements

AUDIT TOOLS:

Observation

Formation of deformity

Goniometry

Written documentation

SUPPORTING EVIDENCE FOR RECOMMENDATIONS:

Requirements for splinting – clinical consensus

Duration of use – clinical consensus

Positioning of various parts of the body – clinical consensus

Positioning after reconstructive surgery – variable, no real consensus

SCAR MANAGEMENT

RECOMMENDATIONS:

It is recommended that the Therapist consistently assess the stage of wound healing and identify the appropriate time for implementing scar management techniques. Scar management regimes and modalities should be implemented with full consideration of patient and caregiver factors. Regular review and reassessment should be carried out to monitor progress

CONSIDERATIONS:

The therapist should:

- Be aware of physiological factors contributing to scar formation
- Understand the indications for scar management
- Be competent in the assessment of scar formation using objective and subjective measures
- Be aware of the indications for choice of treatment modality, and the rationale for clinical use. Treatment modalities may include massage, pressure therapy / silicone gel therapy / facial & neck conforming collars & masks / splinting
- Be aware of the functional implications of scar formation
- Be aware of the psychological implications of scarring
- Be aware of the impact, complications and contraindications of the various treatment modalities

AUDIT TOOLS:

Vancouver scar scale

Recorded observations

Digital photography

Standardised functional outcome measures

SUPPORTING EVIDENCE FOR GUIDELINE:

Scar assessment – no real consensus but Vancouver scar scale widely used.

Pressure garment therapy – clinical consensus but lacking evidence based support for type of garment / duration / level of pressure.

Silicone therapy – evidence based consensus for gel sheets

SECTION 5 PSYCHO-SOCIAL GUIDELINES

ANXIETY

RECOMMENDATIONS

No specific treatment recommendations for burn patients can be made due to the lack of controlled studies. However, research suggests that single-session debriefing of hospitalised patients will not aid and might even contribute to posttraumatic stress disorder (PTSD). Other forms of psychological treatment have not been evaluated.

It is therefore recommended that professionals addressing anxiety-related problems follow the general guidelines for treatment of anxiety symptoms and disorders. Such guidelines have been devised by the National Institute for Clinical Excellence (2005) and the Swedish Council on Technology Assessment in Health Care (2005).

The following considerations and suggestions for tools are based on clinical reasoning and research studies of risk factors for poor adjustment. Due to the lack of treatment studies, the considerations are focused on assessment and screening.

CONSIDERATIONS

Professionals addressing anxiety-related problems should

- be integrated into the team of burn care professionals during in-hospital care and during outpatient care
- be aware of the complex interplay between physical and psychological factors that contribute to anxiety
- be competent in assessing burn-specific pain anxiety
- consider the use of non-pharmacological pain interventions in adjunction to routine pain management in order to reduce pain-related anxiety
- be competent in the assessment of anxiety symptoms and anxiety disorders in general and PTSD in particular
- assess lifetime psychiatric disorders and anxiety-related personality traits as these appear to be risk factors for development of PTSD
- assess symptoms of anxiety on a regular basis during in-hospital care and during outpatient care
- have knowledge about possible treatment options and either 1) be able to apply adequate treatment (for instance pharmacological or psychotherapeutic treatment) or 2) recommend referral to available psychological and/or psychiatric care

SUGGESTED AUDIT TOOLS

Symptom checklists

Hospital Anxiety and Depression Scale (HADS)
Impact of Event Scale-Revised (IES-R)
State Trait Anxiety Inventory-State version (STAI-S)
Burn Specific Pain Anxiety Scale (BSPAS)
NEO-Personality Inventory (NEO-PI)
Swedish universities Scales of Personality (SSP)

Diagnostic interviews

Structured Clinical Interview for the DSM-IV Axis I Disorders (Anxiety module - containing the PTSD module)
Clinician-Administered Posttraumatic Stress Disorder Scale

SUPPORTING EVIDENCE FOR RECOMMENDATIONS

There is one randomised controlled study of psychological treatment (Bisson et al, 1997). It was a single-session debriefing of hospitalised burn patients (n = 103) that showed an adverse effect of treatment at one year follow-up. However the treatment group was not equal to the no treatment group concerning baseline levels of symptoms. There are no replication studies concerning debriefing and no other forms of psychological treatment have been properly evaluated.

Prospective studies with structured clinical interviews and self-report instruments suggest that previous psychiatric problems, deviant personality traits, early symptoms of anxiety and pain-related anxiety are strongly associated with PTSD or PTSD symptoms later in recovery (Dyster-Aas et al., accepted; Fauerbach et al 1997; Fauerbach et al 2000; Lawrence & Fauerbach, 2003; Van Loey et al., 2003).

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DEPRESSION

INTRODUCTION

The impact of a severe burn injury on the individual is enormous and multi-dimensional, beginning at the moment of injury, through hospitalization and extends throughout that person's life, thus requiring a bio-psychosocial multidisciplinary approach. Recovery from burn injury typically requires extensive and painful physical rehabilitation¹⁻². In addition, a major burn injury can cause considerable damage to skin integrity, often leading to hypertrophic scarring and functional and aesthetic sequelae²⁻³, which impact on several dimensions of patient's life (namely, familiar, professional, emotional, aesthetic and functional status). These conditions may put patients who suffered serious burn injuries at particular risk for depression. Depression is a psychological disorder with various levels of intensity and complexity that may continue present for several months and even years after discharge³, with consequent deterioration of quality of life.

Physical and emotional problems interact and complicate treatment outcomes, thus emphasizing the importance of providing optimal treatment for the physical illness without neglecting the concurrent psychological distress⁴. Depression has a significant prevalence in burn patients as a consequence of their injury and impact on their lives⁵. Identifying and managing signs and symptoms of depression is an essential part of the burn patient's recovery and rehabilitation processes. Management of depression by specialists is essential to optimize well-being and quality of life and prevent future problems. Psychological support and specialized psychotherapy helps patients to cope and adjust better at each phase of their recovery process and thus foster physical recovery, well-being and quality of life, therefore should be integrated as part of routine burn care⁶.

RISK FACTORS for Depression

Various studies⁷⁻²¹ identified a number of different predictors of post-burn depression, including:

- past history of emotional disturbance, namely, pre-burn depression
- personality (neuroticism, trait anxiety and hypochondria)
- psychiatric history
- poor psychosocial adjustment
- alcohol and other substance abuse
- self inflicted burns
- medical illness
- behavioral self-blame for the burn accident
- employment status at the time of the burn
- pain intensity
- physical disabilities, mental status and social adaptability
- female gender (specially in combination with facial and/or breast disfigurement)

- burn visibility (namely head, neck and hands burns)
- maladaptive coping strategies
- PTSD
- loss of function
- prolonged stay in hospital and complicated surgical course
- symptoms of depression in the hospital

GENERAL RECOMMENDATIONS

- Early screening routine procedures for depression regularly during hospitalization and after discharge to assure accurate diagnosis, effective treatment and follow-up (adapted guideline from b)
- Accurately assess and treat depression which needs to be highly individualized and frequently adjusted according to the burn patients' specific needs ^{15,32}
- Adequate assessment and management of symptoms of depression require the availability of specialized staff in psychosocial care and eventually a specialized clinical service for consulting and referral after discharge
- Depression treatment requires psychological intervention or a combination with medical/ psychopharmacological treatment depending upon the severity of the disorder (adapted from a)
- Identify patients at risk for depression or poor psychosocial adjustment after discharge and refer them to specialized care for monitoring and preventive or treatment strategies ³³
- Counseling should be available to patients and families both during hospitalization and after discharge as a way to minimize problems and maximize well-being ²⁰
- Availability of comprehensive follow-up services with specialized care including psychological support and care should be made more accessible to burn-injured patients post-hospitalization ³¹

Clinical guidance on depression and its treatment can be consulted at:

^a <http://guidance.nice.org.uk/CG23/niceguidance/pdf/English>

^b <http://www.ahrq.gov/clinic/3rduspstf/depression/depressrr.htm>

SPECIFIC RECOMMENDATIONS:

- Careful evaluation of psychiatric disorders in burn patients is needed as soon as their clinical state allows ²²
- Establishment of clear communication between patient and staff so that the patient has the best understanding possible of the nature of the injury and the treatment, allowing the patients as much control as possible in the treatment process ²³
- Cognitive-behavioral interventions reduce depression ⁸
- Pain assessment and management are needed ¹⁴

- Patient with facial and hand scars are forced to deal with disfigurement, grieving the loss, and to adapt to the new image, and must receive particular attention for preventing/reducing emotional impairment ²⁴
- Psychotherapeutic intervention must also be provided for the patient with hidden scars, especially the young woman with breast scars. Group therapy can play an important role in providing this necessary support ²⁵
- Psychologists should promote and support patients' involvement in clinical procedures
- Patients with an abnormal psychological profile - including suicidal ideation - should be given special attention, adequately monitored and regularly followed by appropriate mental health professionals ²⁵
- Evaluate if depression can be related to neuropsychological problems (frequently associated with electrical injuries 8. In this case neurological and neuropsychological evaluations should be conducted to better define sequelae and treatment targets of ELI ²⁶
- Practical advice given in the form of staff-led discussions, before or immediately after discharge has been shown to be much useful for patients ¹⁸
- The role of the psychologist includes direct assessment and psychotherapeutic intervention with the patient and liaison with the surgical and nursing staff ²⁷
- Psychologists can provide training in communication skills for staff members, helping them to prevent and deal with depressive symptoms.

AUDIT TOOLS:

Screening tools has been found to be most effective and minimally burdensome for patients. Literature suggests that a reasonable method would be to initially screen for depression with a short screening tool (PHQ-2, with 2 items), which have been validated in primary care settings ²⁸⁻²⁹ (or others, followed by a more thorough screening tool, such as Patients Health Questionnaire ³⁰ or clinical one as Beck Depression Inventory. If screening is positive, referral for a mental health professional for clinical evaluation and management of depression is required ².

Screening for pain and anxiety should also be conducted.

Questionnaires used for adult patients	Aspects evaluated
Patient Health Questionnaire (PHQ-2)	Screening for Depression
Zung self-rating depression questionnaire	Depression
Hospital Anxiety and Depression Scale	Anxiety and Depression
Brief Symptom Inventory (BSI)	Psychological morbidity
Beck Depression Inventory	Depression
General Health Questionnaire	General Health+depression

Center for Epidemiologic Study Depression Scale	CES-D
Hamilton Depression Rating Scale	Depression
Burn Specific Health Scale	Quality of life and Health status in burn patients
Patients Health Questionnaire (PHQ-9)	Depression
DSM-IV-R Structured Clinical Interview	Psychiatric Disorders

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<http://guidance.nice.org.uk/CG23/niceguidance/pdf/English>
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SECTION 6

RECOMMENDED TOPICS FOR DEVELOPMENT OF FURTHER GUIDELINES

NURSING

- Infection control
- Outreach nursing
- Adult / paediatric care

THERAPY

- Respiratory care
- Exercise & mobilisation
- Functional care & assessment
- Hand assessment & treatment
- Reintegration programmes
- Return to work

PSYCHO-SOCIAL

- Psychological assessment
- Social skills training / social competence
- Support groups – adults & children
- Disfigurement
- Body image
- Self esteem
- Quality of life
- Family issues
- Sleep
- Sexuality / relationships
- Teaching / education
- Child abuse
- Suicidal behavior

GENERAL

- Training & experience in burn care
- Staffing levels
- Documentation / care plans / pathways of care
- Follow up / discharge of patients
- Continuing Professional development
- Outcome measures
- Research
- Discharge planning & follow up
- Communication skills
- Care coordinator