

INTERNATIONAL SPINAL CORD INJURY DATA SETS

SKIN AND SUDOMOTOR/THERMOREGULATION FUNCTION BASIC DATA SET – COMMENTS

The working-group consists of:

Andrei Krassioukov

Marca Sipski Alexander

Ann-Katrin Karlsson

William Donovan

Christopher Mathias

Fin Biering-Sørensen

The loss of supraspinal control of the sympathetic nervous system and the loss of sensation may cause severe long lasting morbidity and might be life-threatening according to the effects on skin and thermoregulation.

The reduced ability to regulate body temperature puts the individual with spinal cord injury (SCI) at risk of both hyperthermia and hypothermia. Fever, hyperthermia and even hypothermia may accompany infections both in the acute and chronic phase of SCI, however increased temperature without identified etiologies is also seen^{1,2}.

Hyperthermia could be a risk following physical activity as well as during stay in warm surroundings due to the impaired capacity to reduce body temperature by vasodilatation and sweating³. The individual with SCI and especially with cervical injury is poikilothermic and is at risk of developing hypothermia in low environmental temperature, even though hypothermia may also be seen in normal ambient temperature⁴.

Hypohidrosis is usually seen below level of lesion, whereas hyperhidrosis could be present above as well as below level of lesion, and may be a sign of ongoing pathological process as e.g. syringomyelia, autonomic dysreflexia, dyspepsia or may accompany micturition and defecation. Hyperhidrosis may also be present without any known cause⁵.

The newly injured as well as those with chronic SCI are at increased risk of developing pressure ulcer^{6,7}. The impaired vasoregulation below level of lesion together with abnormalities in sweating probably contributes and makes the skin more sensitive to pressure. A tendency towards increasing incidence and prevalence of decubital ulcers has been reported⁸.

In accordance with the aims of the International Spinal Cord Injury Data Sets⁹ the aim of the Skin and Sudomotor/Thermoregulation Function Basic Data Set for Spinal Cord Injury is to standardize the collection and reporting of a minimal amount of information on these issues in daily practice. Furthermore, the International Skin and Sudomotor/Thermoregulation Function Basic SCI Data Set makes it possible to evaluate and compare results from various published studies on skin, sudomotor, and thermoregulation function after SCI.

The Skin and Sudomotor/Thermoregulation Function Basic Data Set is applicable to adult individuals with traumatic or non-traumatic supraconal, conal or cauda equina

lesions. To ensure that data are collected in a uniform manner each variable and each response category within variables have been specifically defined.

The Skin and Sudomotor/Thermoregulation Function Basic Data Set will mostly be used in connection with the background information within the International SCI Core Data Set¹⁰. This specifically applies to the documentation of the level, completeness and time post spinal cord lesions, which play an important role on skin, sudomotor, and thermoregulation parameters following injury.

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SKIN AND SUDOMOTOR/THERMOREGULATION FUNCTION BASIC DATA SET – COMMENTS

VARIABLE NAME: Date of data collection

DESCRIPTION: This variable documents the date of data collection

CODES: YYYYMMDD

COMMENTS: As the collection of data on skin and sudomotor/thermoregulatory functions may be carried out at any time since SCI, the date of data collection is imperative to compute time since the spinal cord lesion and to identify the data collected in relation to other data collected on the same individual at various time points.

VARIABLE NAME: Thermoregulation and sudomotor history after spinal cord lesion within the last three months

DESCRIPTION: This variable documents the thermoregulation and sudomotor history after spinal cord lesion within the last three months

CODES: Hyperthermia
Non infectious
Infectious
Unknown
Hypothermia
Non infectious
Infectious
Unknown
Hyperhidrosis
Above level of lesion
Below level of lesion
Hypohydrosis
Above level of lesion
Below level of lesion
Other
Unknown

COMMENTS: Hyperthermia, usually defined as rectal temperature above 38,4° C, as well as hypothermia, defined as rectal temperature below 35° C may be caused by an infection. Hyper and hypothermia may also be caused by increased or decreased environmental temperature; the individual with spinal cord lesion is prone to be poikilothermic. Hyperhidrosis is defined as excessive sweating above or below

level of injury in lack of increased ambient temperature. Hyperhidrosis may be a sign of ongoing pathological process as e.g. syringomyelia, autonomic dysreflexia, dyspepsia or may accompany micturition and defecation. Hyperhidrosis may also be present without any known cause⁵. Hypohidrosis is defined as loss of ability of sweating and is normally seen below level of injury due to disruption of sympathetic outflow. Hypohidrosis may be total or partial. Other thermoregulatory (for example subjective feeling of coldness) and sudomotor findings may be present and should be given and specified.

VARIABLE NAME: Time performed

DESCRIPTION: This variable documents the time the temperature was measured

CODES: HHMM (hours and minutes)
Unknown

COMMENTS: Temperature is affected by the circadian rhythm. Therefore, the time of evaluation should be reported.

VARIABLE NAME: Temperature

DESCRIPTION: This variable documents the body core temperature investigated rectally, orally or in the ear.

CODES: Rectal, degrees C
Ear, degrees C
Oral, degrees C
Unknown

COMMENTS: Present body temperature at the day of investigation should be documented.

VARIABLE NAME: Any skin ulcer at present

DESCRIPTION: This variable documents presence of a skin ulcer at the time of investigation, the grade and location of the ulcer. One diagram with location and grade to be filled in for each ulcer.

CODES: Yes
No
Unknown

If yes: document

grade:

stage I
stage II
stage III
stage IV
unstageable

location:

occiput
ear
scapula
elbow
ribs
spinous process
iliac crest
sacral
ischial tuberosity
trochanter
genitals
knee
malleolus
heel
foot
other location

COMMENTS:

A skin ulcer could be present at any time post spinal cord injury. This variable documents the presence of skin ulcer(s) at the time of investigation. An ulcer is usually seen on prominent body structures and caused by pressure on the region. The location of the ulcer should be documented including right/left side of the body when applicable. A skin ulcer is defined by different grades of skin involvement according to the definitions below^{11,12}.

Stage I: An observable pressure-related alteration of intact skin whose indicators as compared to an adjacent or opposite area on the body may include changes in one or more of the following: skin temperature (warmth or coolness), tissue consistency (firm or boggy feeling), and/or sensation (pain, itching). The ulcer appears as a defined area of persistent redness in lightly pigmented skin, whereas in darker skin tones, the ulcer may appear with persistent red, blue, or purple hues.

Stage II: Partial-thickness skin loss involving epidermis, dermis, or both. The ulcer is superficial and presents clinically as an abrasion, blister, or shallow crater.

Stage III: Full-thickness skin loss involving damage to or necrosis of subcutaneous tissue that may extend down to, but not through, underlying fascia. The ulcer presents clinically as a deep crater with or without undermining of adjacent tissue.

Stage IV: Full-thickness skin loss with extensive destruction, tissue necrosis, or damage to muscle, bone, or supporting

structures (e.g., tendon, joint capsule). Undermining and sinus tracts also may be associated with stage IV pressure ulcers. Pressure ulcers do not progress from stage I to stage II to stage III and ultimately to stage IV. Rather, they begin deep inside the tissues, close to the bone, and erupt on the surface of the skin. Conversely, healing ulcers do not progress in reverse order of the stages. Muscle tissue is more sensitive than skin to pressure-induced ischemia^{3,4}

Unstageable: Full thickness tissue loss in which the base of the ulcer is covered by slough (yellow, tan, gray, green or brown) and/or eschar (tan, brown or black) in the wound bed. Until enough slough and/or eschar is removed to expose the base of the wound, the true depth, and therefore stage, cannot be determined¹³. Stage I pressure ulcers are not always accurately assessed, especially in people with darkly pigmented skin.

VARIABLE NAME: Date of appearance of the ulcer

DESCRIPTION: This variable documents the date appearance of the ulcer. To be given for each ulcer when more than one.

CODES: YYYYMMDD
Unknown

COMMENTS: A skin ulcer could usually presents with minor alteration to the skin and progress later. The date of appearance should be the date when the first alteration to the skin was observed. If the date is unknown this should be documented.

VARIABLE NAME: Surgical treatment

DESCRIPTION: This variable documents if the ulcer has been surgically treated. To be given for each ulcer if more than one.

CODES: Yes
Date for last surgical treatment YYYYMMDD
No
Unknown

COMMENTS: Surgical treatment may include all from small debridement of the surface of the ulcer to rotation flaps. In this context the variable surgical treatment includes major surgical methods as e.g. direct closure, skin grafting, rotation flaps. Minor debridement is here defined as conservative treatment and should not be documented.

VARIABLE NAME: Any skin ulcer during the last 12 months

DESCRIPTION: This variable documents presence of any skin ulcers during the last 12 months.

CODES: Yes
No
Unknown

COMMENTS: A skin ulcer could have been present at any time post spinal cord injury. This variable documents the presence of any skin ulcer(s) during the period of the last 12 months only.

References:

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12. Cuddigan, J., and R.A. Frantz. Pressure ulcer research: Pressure ulcer treatment. A monograph from the National Pressure Ulcer Advisory Panel. *Adv Wound Care* 11 (1998):294–300.
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SKIN AND SUDOMOTOR/THERMOREGULATION FUNCTION BASIC DATA SET – DATA FORM (Version 1.0)

Date of data collection: YYYYMMDD Unknown

Thermoregulation and sudomotor history after spinal cord lesion within the last three months:

- | | |
|---|---|
| <input type="checkbox"/> Hyperthermia | <input type="checkbox"/> Non infectious |
| | <input type="checkbox"/> Infectious |
| | <input type="checkbox"/> Unknown |
| <input type="checkbox"/> Hypothermia | <input type="checkbox"/> Non infectious |
| | <input type="checkbox"/> Infectious |
| | <input type="checkbox"/> Unknown |
| <input type="checkbox"/> Hyperhidrosis | <input type="checkbox"/> Above lesion |
| | <input type="checkbox"/> Below lesion |
| <input type="checkbox"/> Hypohidrosis | <input type="checkbox"/> Above lesion |
| | <input type="checkbox"/> Below lesion |
| <input type="checkbox"/> Other, specify _____ | |
| <input type="checkbox"/> Unknown | |

Objective measures:

Time performed: _____ HHMM Unknown

- Temperature:**
- | | |
|----------------------------------|----------|
| <input type="checkbox"/> Rectal | _____ °C |
| <input type="checkbox"/> Ear | _____ °C |
| <input type="checkbox"/> Oral | _____ °C |
| <input type="checkbox"/> Unknown | |

Any skin ulcer at present: Yes No Unknown

If yes,

Fill in one diagram for each ulcer, by indicating the ulcer stage (I, II, III, IV, U (instageable)) at the appropriate location according to the classification by Cuddigan and Frantz, 1998; National pressure ulcer advisory panel (NPUAP): [Pressure Ulcer Stages Revised, 2007](#):

	Right	Mid-line	Left
Occiput			
Ear			
Scapula			
Elbow			
Ribs			
Spinous process			
Iliac crest			
Sacral			
Ischial tuberosity			
Trochanter			
Genitals			
Knee			
Malleolus			
Heel			
Foot			

Other location: _____

Date of appearance of the ulcer: YYYYMMDD Unknown

Has the ulcer been surgically treated: Yes No Unknown

If yes, **date of last surgical intervention:** YYYYMMDD

Any skin ulcer during the last 12 months: Yes No Unknown