

# The Redsci

Rapid Examination for Detection of Spinal Cord Injury

# Waarom

Weinig literatuur prehospital fase SCI,

Geen prehospital detectie/monitor  
neurologische functie test,

Geen uniforme beschrijving van SCI,

Geen gepast alternatief

# Doel instrument

- Quick scan key muscles
- tijdsmonitor
- Geschikt voor ambulanceveld

## ASIA STANDARD NEUROLOGICAL CLASSIFICATION OF SPINAL CORD INJURY

		MOTOR KEY MUSCLES		LIGHT TOUCH R L		PIN PRICK R L		SENSORY KEY SENSORY POINTS	
C2	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C3	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C4	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C5	<input type="checkbox"/>	<input type="checkbox"/>	Elbow flexors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C6	<input type="checkbox"/>	<input type="checkbox"/>	Wrist extensors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C7	<input type="checkbox"/>	<input type="checkbox"/>	Elbow extensors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C8	<input type="checkbox"/>	<input type="checkbox"/>	Finger flexors (distal phalanx of middle finger)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
T1	<input type="checkbox"/>	<input type="checkbox"/>	Finger abductors (little finger)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
T2	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
T3	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
T4	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
T5	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
T6	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
T7	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
T8	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
T9	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
T10	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
T11	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
T12	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
L1	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
L2	<input type="checkbox"/>	<input type="checkbox"/>	Hip flexors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
L3	<input type="checkbox"/>	<input type="checkbox"/>	Knee extensors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
L4	<input type="checkbox"/>	<input type="checkbox"/>	Ankle dorsiflexors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
L5	<input type="checkbox"/>	<input type="checkbox"/>	Long toe extensors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
S1	<input type="checkbox"/>	<input type="checkbox"/>	Ankle plantar flexors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
S2	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
S3	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
S4-5	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Voluntary anal contraction (Yes/No)     
  Any anal sensation (Yes/No)

**TOTALS**  +  =  **MOTOR SCORE** (MAXIMUM) (50) (50) (100)

**TOTALS**  +  =  **PIN PRICK SCORE** (MAXIMUM) (56) (56) (56)

**TOTALS**  +  =  **LIGHT TOUCH SCORE** (MAXIMUM) (56) (56) (56)

**NEUROLOGICAL LEVEL**  
 The most caudal segment with normal function

SENSORY: R  L   
 MOTOR: R  L

**COMPLETE OR INCOMPLETE?**   
 Incomplete = Any sensory or motor function in S4-S5

**ASIA IMPAIRMENT SCALE**

**ZONE OF PARTIAL PRESERVATION**  
 Caudal extent of partially innervated segments

SENSORY: R  L   
 MOTOR: R  L

0 = total paralysis  
 1 = palpable or visible contraction  
 2 = active movement, gravity eliminated  
 3 = active movement, against gravity  
 4 = active movement, against some resistance  
 5 = active movement, against full resistance  
 NT = not testable

0 = absent  
 1 = impaired  
 2 = normal  
 NT = not testable

# REDSCI

- Geeft aanwijzing voor ASIA score grade A, B en C.
- Hypothese validiteit: 93% van alle voorkomende SCI.



Alert?

## Veldtest

- Twee ambulancediensten,
- Observationeel en prospectief design
- Elearning & telefoon & stickers & formulieren.
- Observatie REDSCI formulieren
- EPC data
- Innovatie model Grol (Zonmw)
- Telefonische interviews
- Inclusie LPA 7
- Exclusie leeftijd
- April –juni 2013

Content	VRGZ	VGGM	Total
Inhabitants in region, 2011	534,234*	659,449*	1,193,683*
Total calls, 2011	31,968*	34,431*	66,399*
Calls with high priority, 2011	13,114*	14,333*	27,447*
Eligible immobilized patients, total calls per year**	723**	887***	1610**
Immobilized patients over 17 years, high priority calls	495**	605**	1,100**
Immobilized patients over 17 years, high priority call, during study period April until June 2013	103**	145**	248**
Total of RNs	82*	78*	160*
Total of ambulances	21*	23*	44*

## Results

- 36 patiënten REDSCI
- Exclusie door leeftijd (5), geen immobilisatie (1), dubbele registratie (1)
- 27 geen SCI, 2 onzeker door letsel extremiteiten.
- 16 unieke gebruikers REDSCI
- 19 ingevulde innovatie enquêtes
- 30 telefonische interview, 4 REDSCI gebruikers

	EPCs VGGM N=19	EPCs VRGZ N=10	Total EPCs N=29
Age, in mean years (SD)	45.3 (14.6)	42.0(17.8)	43.3(16.6)
Male in n (%)	9 (47.4%)	7(70.0%)	16(55.2%)
RN fidelity Unique RNs n (%)*	10 (12,2%)	6 (7.3%)	16 (10.0%)
Mean GCS, in gcs points(SD)	14.4 (2.4)	14.9(0.3)	14.6(1.9)
GCS< 8 in n (%)	1 (5.3%)	0(0%)	1(3,4%)
Traffic n (%)	13 (68.4%)	4(40.0%)	17(58.6%)
Falls n (%)	6 (31.6%)	4(40.0%)	10(34.5%)
Time on scene, in min(SD)**	21 (6)	25(9)	24(8)
Time of transport, in min(SD)**	15 (5)	20(12)	18(10)

**Organization**

*Other disciplines were not collaborative.*

*Some colleague RNs didn't collaborate with the NEC.*

*Management staff did not collaborate.*

*The application of this instrument is difficult due to little or no knowledge of my medical assistant.*

*Applying the NEC should be financially compensated.*

Neutral

Neutral

Neutral

Disagree

Disagree

Organisatorisch geen  
belemmeringen of  
verandering nodig

**Patient**

*The NEC is not applicable within elderly patient.*

*The timing when symptoms of TSCI were measured is not convenient.*

*Patient specific information can be merged within the classification of the NEC.*

*Difficulties with patients who had different cultural status.*

*The NEC is not applicable to patients in pain.*

*Patients with low social status refused collaboration.*

*The application of the NEC is difficult on patients that are not (badly) injured.*

*Patients in general did not collaborate in application of the NEC.*

Disagree

Disagree

Agree

Neutral

Disagree

Disagree

Disagree

Disagree

Geen beperking  
in toepassing of  
patiënt

**Instrument**

*The NEC layout is practical.*

*The NEC is likely to be misused in disciplinary hearings.*

*Some parts within the NEC are faulty.*

*Some parts are missing of the NEC.*

*There is insufficient working space in the ambulance to complete the NEC.*

*Applying the NEC consumes a lot of time.*

Agree

Disagree

Disagree

Disagree

Disagree

Disagree

REDSCI wordt  
goed  
ontvangen

**Caregiver/EMS staff**

*My own considerations can be accounted for within the NEC.*

*Thanks to the NEC, I now know more of TSCI.*

*I need more knowledge before I can work with the NEC.*

*I am not well trained for application of this instrument.*

*I didnt not read or study or remember given information concerning the application of the NEC.*

*The application of the NEC does not fit in my professional attitude.*

*In general, i am reluctant to work according to standards.*

*I have difficulties to change routines.*

*I am reluctant to use the NEC because I was not involved in the development*

Agree

Agree

Disagree

Disagree

Disagree

Disagree

Disagree

Disagree

Disagree

Geen  
beperkingen in  
leercruve  
AmbVpk

Lage incidentie SCI

Geen sensorische test

Probleem tweede test moment

Praktisch, uniform, gemakkelijk

Inpasbaar huidige workflow

Motivatie en noodzaak



Onwennig

Geen informatie gelezen

Teveel andere studies

Geen patiënt

Studie duur tekort

# Discussie

- Rapid Examination for Detection of Spinal Cord Injury
- Validatie
- Lage getrouwheid.



# Vragen

De patiënt met een  
hemiparese

De patiënt in  
zithouding