CONGRESSO NAZIONALE IRC 2022

TRAUMA: NUOVE EVIDENZE E PERCORSI

AUDITORIUM DELLA TECNICA • ROMA • 14-15 OTTOBRE

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Dalla scena all'Ospedale

L'immobilizzazione nel trauma: scomoda necessità o utile possibilità?

Quale presidio: Spinale vs Materasso

Alberto Spella
Infermiere
Emergenza Territoriale - Elisoccorso Regionale - Massa Carrara

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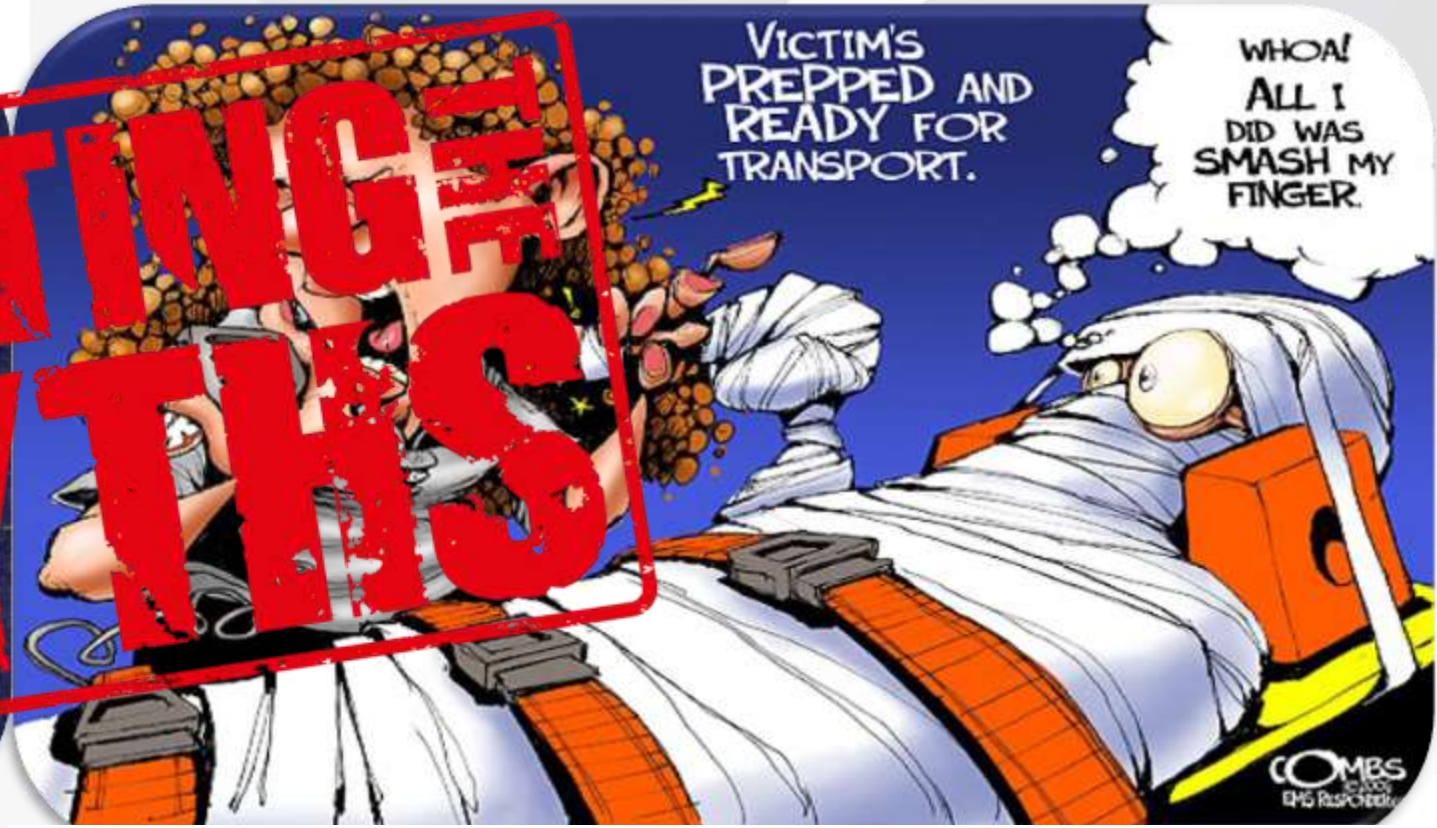
BUSTING THE MYTHS



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Keywords

- Immobilisation
- Prehospital trauma treatment
- Spinal stabilisation
- Spineboard
- Vacuum mattress
- Traumatic spinal cord injury
- Guideline

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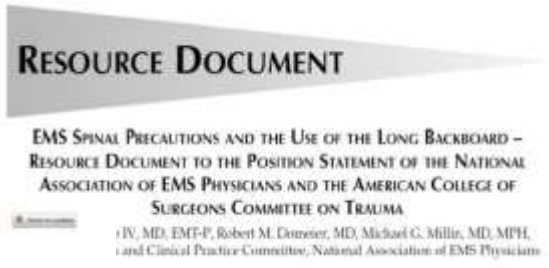
Guidelines – rewis....



Nessuno studio ha evidenziato un miglioramento dell'outcome

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Maschmann *et al. Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine* (2019) 27:77
https://doi.org/10.1186/s13049-019-0655-x

Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine

GUIDELINE Open Access

New clinical guidelines on the spinal stabilisation of adult trauma patients – consensus and evidence based

Christian Maschmann[1,2,3*], Elisabeth Jeppesen[4,5], Monika Afzali Rubin[6,7] and Charlotte Barfod[3]

Members of the Danish interdisciplinary working group

- Danish Society for Emergency Medicine – DASEM (chairman)
- Danish Neurosurgical Society – DNKS
- Danish Society for Spinal Surgery – DRKS
- Danish Orthopaedic Society - DOS
- Danish Orthopaedic Trauma Society – DOTS
- Danish Society for Anesthesiology and Intensive Care Medicine – DASAIM
- Danish Society for Radiology - DRS
- Danish Society for Ambulance- and Paramedicine – DSAP
- ATLS® Denmark
- PHTLS® Denmark
- ITLS® Denmark
- Greater Copenhagen Fire Department – HBR (ambulance services)
- Falck A/S (ambulance services)
- Responce A/S (ambulance services)
- Ambulance Southern Denmark (ambulance services)
- EMS Copenhagen
- EMS Region North Denmark
- EMS Region Central Denmark
- EMS Region Southern Denmark
- EMS Region Sealand

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PICO

Table 2 The PICO questions

Clinical question	Population	Intervention	Comparator	Outcome
Should adult trauma patients where there is concern for the development of a secondary spinal cord injury undergo spinal stabilisation...	Adult trauma patients (> = 18 years), where there is concern for the development of a secondary spinal chord injury			
1.) ...with a rigid cervical collar?	ditto	Rigid cervical collar	No rigid cervical collar	Mortality Neurologic morbidity Ulcerations Pain / discomfort Respiratory deterioration Time to diagnose Intracranial pressure
2.) ...on a hard backboard?	ditto	Hard backboard	No hard backboard	Mortality Neurologic morbidity Pain/discomfort Ulcerations Time to diagnose
3.) ...in a vacuum mattress?	ditto	Vacuum mattress	No vacuum mattress	Mortality Neurologic morbidity Pain/discomfort Ulcerations Time to diagnose
4.) Should adult trauma patients with isolated penetrating injuries undergo spinal stabilisation?	ditto	Spinal stabilisation	No spinal stabilisation	Mortality Neurologic morbidity
5.) Should the decision, whether and how to stabilise the spine of a trauma patient be facilitated by a clinical decision tool?	ditto	Use of a clinical decision tool	No use of a clinical decision tool	Mortality Neurologic morbidity

GRADE

Table 3 Summary of main recommendations, quality of evidence and strength of recommendation

Recommendation	Quality of evidence	Strength of recommendation
Adult trauma patients should not undergo spinal stabilisation with a rigid cervical collar	very low	weak
Adult trauma patients should not undergo spinal stabilisation on a hard backboard unless in case of time-critical ABCDE-unstable patients, where other spinal stabilisation measures would be more time consuming	very low	weak
Adult ABCDE-stable patients with neurologic deficit and / or osseous spinal pain on examination should undergo spinal stabilisation in a vacuum mattress	very low	weak
Adult trauma patients with isolated penetrating injury should not undergo spinal stabilisation	moderate	strong
Our triaging tool should be used in order to facilitate decision on spinal stabilisation	none	good clinical practice

Raccomandazioni

❑ **Pazienti instabili (ABCDE)**

❑ **Pazienti stabili (ABCDE)**
- ✓ Deficit neurologico
- ✓ Dolore al rachide

Kornhall *et al. Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine* (2017) 25:2
DOI 10.1186/s13049-016-0345-x

Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine

REVIEW Open Access

The Norwegian guidelines for the prehospital management of adult trauma patients with potential spinal injury

Daniel K Kornhall[1,2,3*], Jørgen Joakim Jørgensen[4,5], Tor Brommeland[6], Per Kristian Hyldmo[7,8], Helge Asbjørnsen[9,10], Thomas Dolven[9], Thomas Hansen[11] and Elisabeth Jeppesen[12,13]

PICO

Table 1 Overview of key clinical questions in the PICO format

Clinical question	P	I	C	O
Does routine use of spinal stabilisation prevent secondary neurological injury?	Trauma population	Spinal stabilisation	Stabilisation vs no stabilisation	Neurological morbidity
Are there alternative ways of stabilising the spinal column?	Trauma population	Spinal stabilisation	collar/MILS/stretcher/backboard	Neurological morbidity Pain/discomfort
Is there evidence of harmful side effects caused by stabilisation devices?	Trauma population	Spinal stabilisation	Stabilisation vs no stabilisation	Neurological morbidity Pain, discomfort, ulceration
Are there sub-groups of patients that in particular should not be stabilised?	Critical injuries Minor injuries	No spinal stabilisation	Stabilisation vs no stabilisation	Neurological morbidity & mortality
How should patients with potential spinal injury be evacuated and transported?	Trauma population	Extrication & transport	Stretcher, vacuum mattress, backboard	Neurological morbidity & mortality Pain, discomfort, ulceration

PICO Population, Intervention, Comparator, Outcome

GRADE

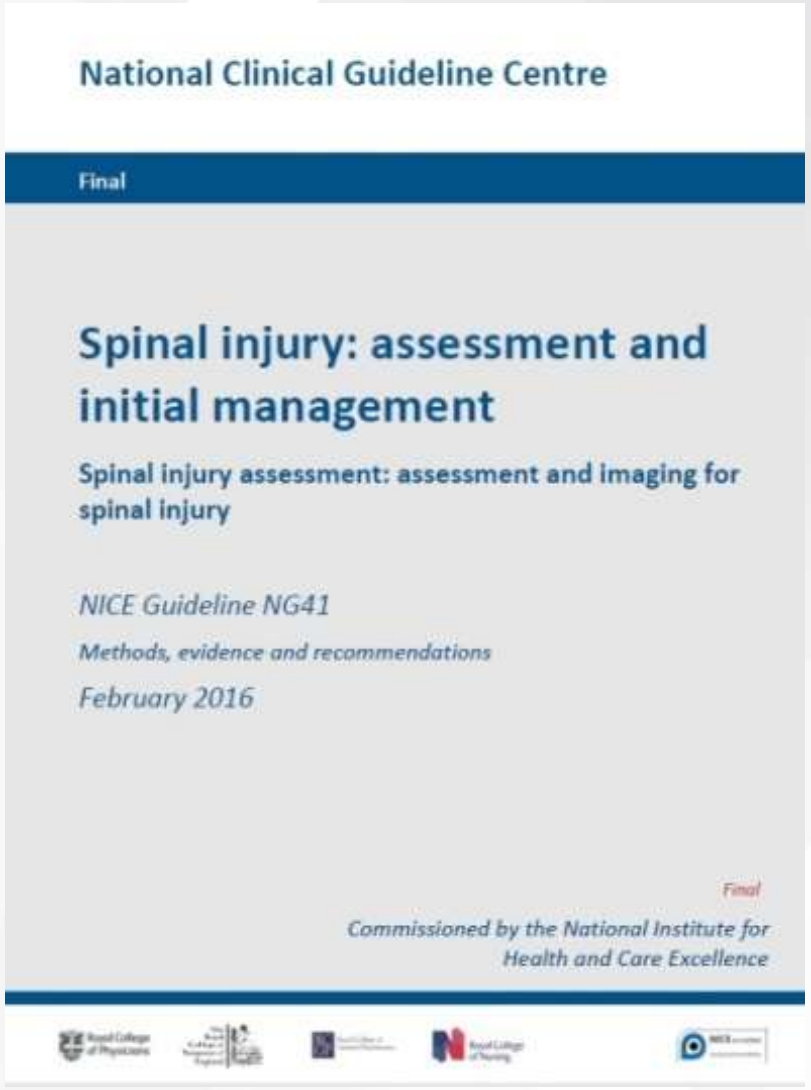
Table 2 Summary of recommendations, quality of evidence and strength of recommendation

	Recommendation	Quality of evidence	Strength of recommendation	Rationale (Benefits, harms and the preferences of patients and clinicians)
1	Victims with potential spinal injury should have spinal stabilisation.	Very low	Strong	Paucity of literature supporting spinal stabilisation. Very little literature documenting serious harm. Spinal cord injury can have devastating consequences. Potential benefits outweigh harms
2	A minimal handling strategy should be observed.	Very low	Strong	Paucity of literature supporting spinal stabilisation. Very little literature documenting serious harm. Spinal cord injury can have devastating consequences. Potential benefits outweigh possible harms
3	Spinal stabilisation should never delay or preclude life-saving intervention in the critically injured trauma victim.	Very low	Good clinical practice	Literature supporting this recommendation was considered too heterogenous for synthesis. The faculty finds that it is logical that spinal stabilisation in the critically injured patient may cause serious harm
4	Victims of isolated penetrating injury should not be immobilised.	Moderate	Strong	One large study of moderate quality directly supports this recommendation. Spinal injury in patients with isolated penetrating injury is rare
5	Triaging tools based on clinical findings should be implemented.	Moderate	Strong	Consistent evidence supporting triaging tools based on clinical findings rather than mechanism. No harmful effects documented
6	Cervical stabilisation may be achieved using manual in-line stabilisation, head-blocks, a rigid collar or combinations thereof.	Very low	Conditional	Consistent experimental evidence demonstrating how rigid collars can stabilise the cervical spine. However, there is also evidence suggesting harm from rigid collars. No evidence proving superiority of any one method
7	Transfer from the ground or between stretchers should be achieved using a scoop stretcher.	Very low	Conditional	General paucity of evidence. Some evidence for significant spinal motion during log-roll. Some evidence documenting improved stability with scoop stretcher transfers. Safety of scoop stretcher systems is good. No harmful effects documented
8	Patients with potential spinal injury should be transported strapped supine on a vacuum mattress or on an ambulance stretcher system.	Very low	Conditional	Evidence supporting harm from hard surface stretcher systems. No consistent evidence demonstrating increased stability with any one method. Increased comfort associated with soft surface systems. No evidence exploring spinal stability of common stretcher systems
9	Hard surface stretcher systems may be used for transports of shorter duration only.	Very low	Conditional	Evidence supporting harm from hard surface stretcher systems. No consistent evidence demonstrating increased stability with any one method. Increased comfort associated with soft surface systems
10	Patients should under some circumstances be invited to self-extricate from vehicles.	Very low	Conditional	Two experimental studies demonstrating improved stability with self-extrication from vehicles. Reasonable and practical alternative as long as used cautiously

Raccomandazioni

- I pazienti con potenziali lesioni spinali devono essere trasportati in posizione supina su un **materasso a depressione** o sulla **barella** dell'ambulanza

- I sistemi di trasporto a **superficie rigida** (tavola spinale) possono essere utilizzati **solo** per **trasporti di breve durata**.


National Clinical Guideline Centre
Final
Spinal injury: assessment and initial management
Spinal injury assessment: assessment and imaging for spinal injury
NICE Guideline NG41
Methods, evidence and recommendations
February 2016
Final
Commissioned by the National Institute for Health and Care Excellence

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PICO

Table 16: PICO characteristics of review question

Population	Children, young people and adults experiencing a traumatic incident. If no evidence is identified the indirect population of healthy volunteers will be considered
Intervention/s	• Spinal boards (long or short) • Rescue board • Scoop stretcher • Spinal extrication devices • Back boards • Collar and back board combinations • Vacuum mattress • Mattress splints • Collars (rigid or soft) • Manual stabilization • Sand bags, straps and tapes, head blocks, aqua board • Kendrick Extrication Device (KED) • Or any combinations of the above
Comparison/s	• Standard care • Do nothing • Each other or combinations of above
Outcomes	Critical: • Mortality at 1 month • Mortality at 6 months • Mortality at 12 months • Health-related quality of life • Rates of spinal cord injury (SCI) • Missed spinal column/cord injury • Spinal cord neurological function at 1 month (including American Spinal Injury Association [ASIA] and Frankel) • Spinal cord neurological function at 6 months (including ASIA and Frankel) • Spinal cord neurological function at 12 months (including ASIA and Frankel) • Adverse effects: • Pressure ulcers • Airway compromise • Raised ICP • Neurological deterioration [ASIA]) associated with spinal protection/immobilisation. Important: • Pain/discomfort • Return to normal activities • Psychological wellbeing
Study design	RCTs or Systematic reviews of RCTs; cohorts or case-controls if no RCTs retrieved.

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Raccomandazioni

- ❑ **Indicato** come presidio per **l'estricazione**
- ❑ **Non utilizzare** come presidio da **trasporto**
- ❑ La **permanenza prolungata** può essere dannosa e provocare:
  - ✓discomfort
  - ✓dolore (occipitale, lombosacrale...)
- ❑ **Da rimuovere** non appena praticabile **in sicurezza**

- ❑Maggior **sicurezza** per il **paziente** durante il trasporto
  "to feel secure"
- ✓ minor dispersione termica
- ✓ maggiore protezione dalle condizioni ambientali
- ❑ Criticità sulla disponibilità (spazio, peso,costi)

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PREHOSPITAL EMERGENCY CARE 2014;18:306–314

RESOURCE DOCUMENT

EMS Spinal Precautions and the Use of the Long Backboard – Resource Document to the Position Statement of the National Association of EMS Physicians and the American College of Surgeons Committee on Trauma

Chelsea C. White IV, MD, EMT-P, Robert M. Domeier, MD, Michael G. Millin, MD, MPH, and the Standards and Clinical Practice Committee, National Association of EMS Physicians

Considerazioni

- **Tavola spinale**
  - ✓ Maggiori **RISCHI*** vs benefici (*tempi!)
  - ✓ Utile come presidio per l'estricazione

- **Barella dell'ambulanza**
  - ✓fornisce un'adeguata protezione del rachide
  - ✓ Il materasso riduce i movimenti del paziente
  - ✓ Nessun rischio rispetto all'uso tavola spinale

MS et al. Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine (2021) 29:46
https://doi.org/10.1186/s13049-021-00854-w

Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine

ORIGINAL RESEARCH Open Access

Vacuum mattress or long spine board: which method of spinal stabilisation in trauma patients is more time consuming? A simulation study

Roessler MS[1*], M Riffelmann[2], N Kunze-Szikszay[1], M Lier[1], P Schmid[3], H Haus[1], S Schneider[4] and Heuer JF[5]

Table 2 Times needed for the stabilisation procedures stratified by the condition

Parameter	Stabilisation method		p-value
	Spine board (*n*=94)	Vacuum mattress (*n*=78)	
Total time	94.0 (88.1 – 99.9) ≈2 min	289.5 (267.8 – 311.2) ≈6 min	< 0.01
Total time ideal conditions	83.4 (77.5 – 89.3)	254.4 (235.6 – 273.2)	< 0.01
Total time realistic conditions	112.6 (102.6 – 122.6)	358.3 (316.0 – 400.6)	< 0.01

The mean values with 95% confidence interval in brackets are expressed in seconds
n numbers

Table 3 Time needed for the stabilisation procedures stratified by qualification of the personnel

Qualification	Spine board	Vacuum mattress	p-value (adjusted)
Emergency physician	90.0 (95% CI 71.3 – 108.8)	295.4 (95% CI 260.6 – 330.1)	< 0.01
Medical student	89.0 (95% CI 81.6 – 96.5)	258.0 (95% CI 236.5 – 279.5)	< 0.01
Paramedic in training	82.9 (95% CI 71.5 – 94.2)	192.5 (95% CI 167.8 – 217.2)	< 0.01
Paramedic	82.3 (95% CI 70.5 – 94.1)	286.1 (95% CI 247.6 – 324.7)	< 0.01
Firefighter	108.8 (95% CI 97.0 – 120.5)	336.9 (95% CI 282.2 – 391.6)	< 0.01

The mean values with 95% confidence interval in brackets are expressed in seconds

Tempo raccomandato "on scene"

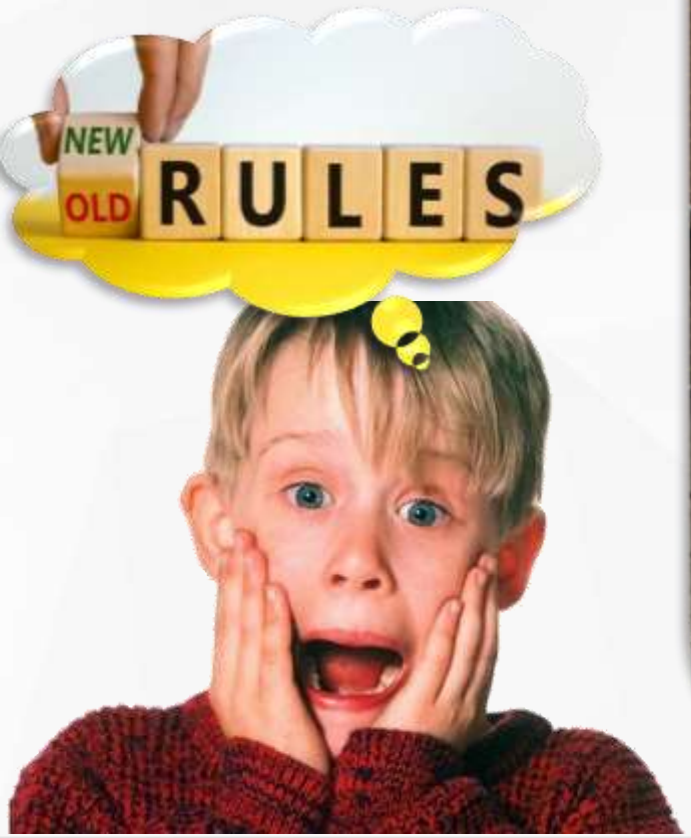
- ✓ Paziente stabile ≤ 30 minuti
- ✓ Paziente instabile ≤ 10 minuti

Tempo posizionamento

- ✓ Tavola spinale: < 1/3 rispetto al Materasso
- ✓ Materasso: 20% tempo "on scene"

Indicazioni Tavola spinale

- ✓ Pazienti instabili (ABCDE)
- ✓ Terreno inaccessibile/irregolare


NEW
OLD
RULES


CARE FLITE
COOKE COUNTY EMS
940-665-1012

~~"Spinal immobilization"~~

"Spinal Motion Restriction"

- ✓Approccio selettivo
- ✓Giuste precauzioni di utilizzo

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Spinale vs Materasso...in sintesi

Rule #1
Do No Harm
Rule #2
Do Good

- ✓ **Paziente ABCDE instabile**
- ✓ Rapidità di utilizzo
- ✓ Estricazione
- ✓ Terreno inacassibile/irregolare

- ⊗ Paziente ABCDE stabile
- ⊗ Disagio-agitazione*
- ⊗ Dolore moderato-grave
- ⊗ Movimenti volontari del rachide*
- ⊗ Movimenti laterali durante trasporto
- ⊗ Lesioni da pressione
- ⊗ Compromissione respiratoria
- ⊗ Esami radiologici non necessari

- ✓ **Paziente ABCDE stabile**
- ✓ Comfort
- ✓ Riduzione effetti avversi
- ✓ Miglior stabilizzazione del rachide
- ✓ Protezione del paziente

- ⊗ Paziente ABCDE instabile
- ⊗ Tempi di posizionamento
- ⊗ Disponibilità,spazio,costi

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Conclusioni

- ✓Nessuno studio ha evidenziato un miglioramento dell'outcome
- ✓L'utilizzo della tavola spinale è gravato da complicanze
- ✓Materasso a depressione e barella garantiscono stabilità e comfort nel paziente
- ✓Necessario un cambiamento culturale nei sistemi PreH ed InH
- ✓Implementare il concetto di "restrizione " vs "immobilizzazione"
- ✓Prevenire danni secondari iatrogeni legati alla strategia/presidio

"Quando soffia il vento del cambiamento, alcuni costruiscono dei ripari ... altri costruiscono dei mulini a vento"

...grazie !

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