Mild TBI

Epidemiologia del trauma cranico lieve

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Pronto Soccorso e Medicina d’Urgenza

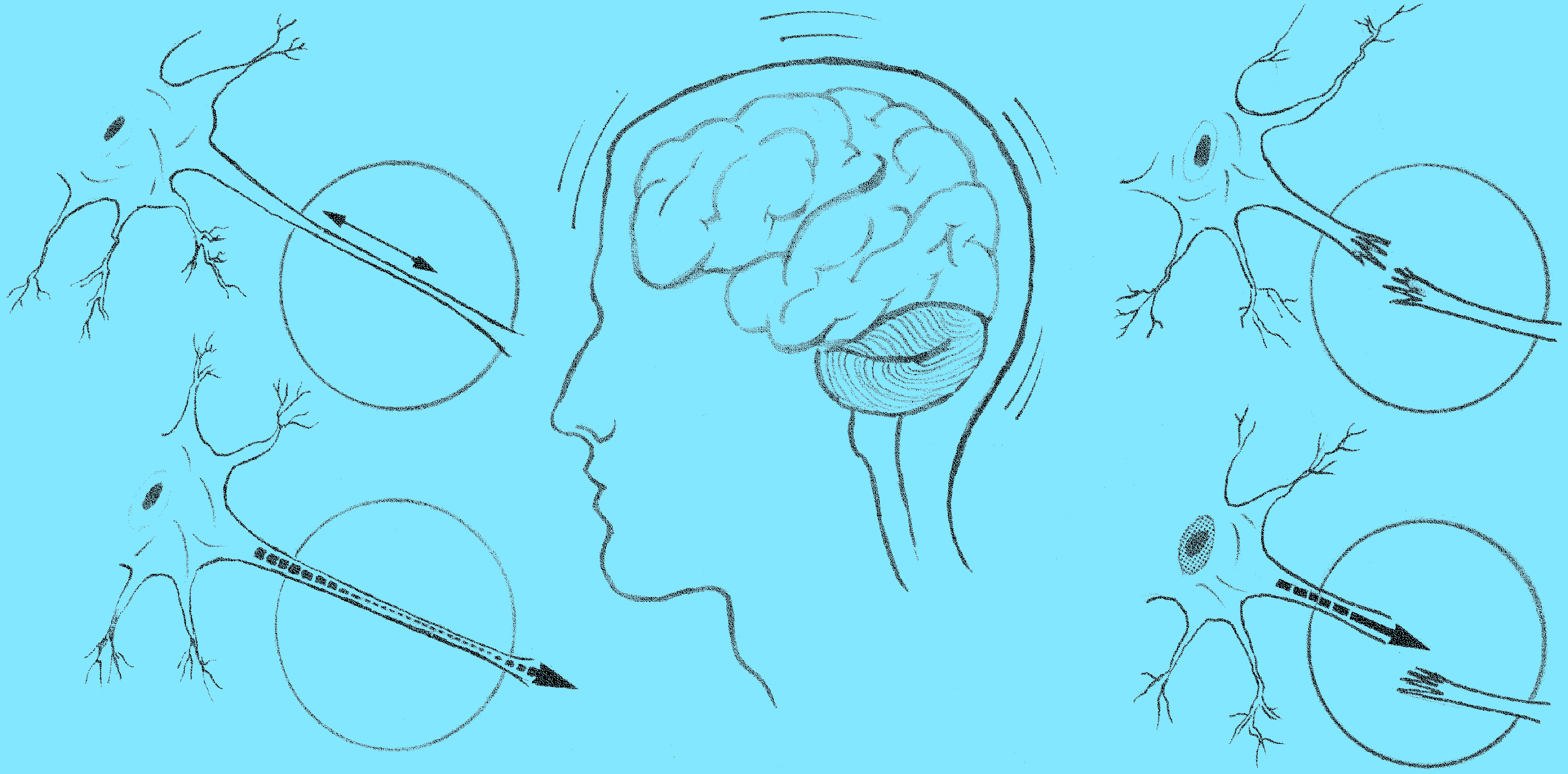
Ospedale Maggiore

Ausl Bologna

Che cos’è un danno encefalico lieve?

- Un danno al cervello causato da un trauma del capo o da una lesione penetrante del capo.
- Il danno può interessare una singola area dell’encefalo (danno focale) o interessare multiple aree del cervello (danno diffuso).
- Le conseguenze possono essere di breve o di lungo termine.

Meccanismo di lesione



In ITALIA

Ogni anno 250 pazienti ogni 100.000 abitanti vengono ricoverati in Italia per trauma cranico.

La mortalità è di circa 17 casi per 100.000 abitanti per anno1.

L'Italia si trova in piena "media" Europea considerando l'incidenza media in Europa di 232 casi per 100.000 abitanti ed una mortalità di 15 casi per 100.000 abitanti.

LLGG 2001

Fattori di rischio

Fattori preesistenti al trauma	Fattori conseguenti al trauma
Intossicazione da alcool e droga	Cefalea diffusa ingravescente
Coagulopatie e trattamenti anti-coagulanti	Perdita di coscienza (PdC, associata ad altri fattori)
Storia di epilessia	Vomito
Età > 65 anni	Amnesia (APT)
	Crisi convulsiva post-traumatica
	Dinamica del trauma
	Frattura cranica

Mol Cell Neurosci. 2015 May ; 66(0 0): 75–80. doi:10.1016/j.mcn.2015.03.001.

Epidemiology of mild traumatic brain injury and neurodegenerative disease

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Risk Factors for Post-TBI Neurodegenerative Diseases and CTE

multiple additional risk

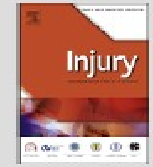
Apolipoprotein E (APOE) ε4 allele
recreational drug
steroid use,
alcohol abuse,
chronic psychiatric disease, or cardiovascular risk factors modify risk of CTE,
children or adolescents may be particularly morbid.
older adults are at higher risk of dementia

there may be “critical periods” during which TBI may be more likely to produce chronic neurologic sequelae or neurodegeneration.
Gender effects are also understudied.
The vast majority of cases of CTE have been in males

Problemi nella raccolta dei dati

- Database non strutturati
- disomogeneità di classificazione
- disomogeneità di codifica

The changing face of mild head injury: Temporal trends and patterns in adolescents and adults from 1997 to 2008



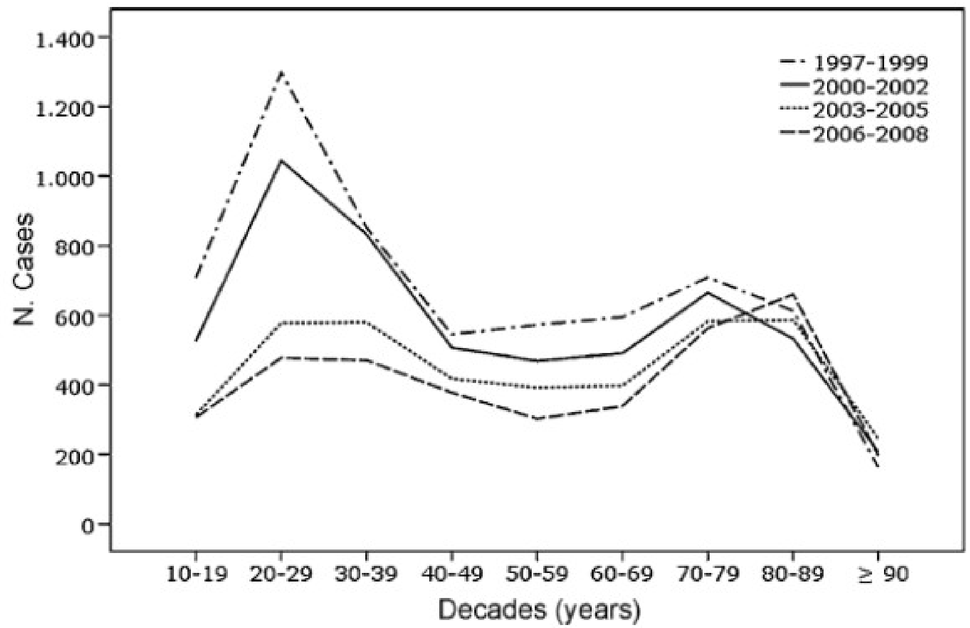


Fig. 1. Number of cases visited in the Emergency Department for mild head injury in four time periods, divided according to age-decades. Note the disappearance of the bimodal distribution of age along the years.

Fabbri A. ***Injury*** *2010*

Proporzione di Trauma Cranico Lieve, Moderato e Severo

Severity of traumatic brain injury

Mild	GCS 14-15
Moderate	GCS 9-13
Severe	GCS <9

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Traumatic Brain Injury (TBI) - Definition, Epidemiology, Pathophysiology

Updated: Mar 19, 2021
Author: Segun Toyin Dawodu, JD, MD, MS, MBA, LLM, FAAPMR, FAANEM; Chief Editor: Stephen Kishner, MD, MHA

A National Health Interview Survey estimated that annually, 1.9 million persons sustain a skull fracture or intracranial injury, with such trauma making up approximately 1% of all injuries.

- mild TBI is about 131 cases per 100,000 people,
- moderate TBI is about 15 cases per 100,000 people,
- severe TBI is approximately 14 cases per 100,000 people.

The inclusion of prehospital deaths increases the last figure to 21 cases per 100,000 people.

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Mild TBI
the average rate of mild TBI was 503.1 cases per 100,000, with peaks among males at 590 cases per 100,000 population, among

Sports and bicycles account for about 26.4% of mild TBIs among children aged 5-14 years.
Looking at 2009-2010 data, the investigators reported the following ED-visit rates for mild TBI[13] :

- Age 65-74 years - 386 per 100,000
- Age 75-84 years - 777 per 100,000
- Age >84 years - 1205 per 100,000

The rate for women aged 65 years or older was 706 per 100,000, compared with 516 per 100,000 for men in the same age group.

Skandsen *et al. Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine* (2018) 26:34
https://doi.org/10.1186/s13049-018-0495-0

Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine

ORIGINAL RESEARCH Open Access

The epidemiology of mild traumatic brain injury: the Trondheim MTBI follow-up study

Toril Skandsen[1,2*], Cathrine Elisabeth Einarsen[1,2], Ingunn Normann[1], Stine Bjøralt[1], Rune Hatlestad Karlsen[1,2], David McDonagh[3,4], Tom Lund Nilsen[7], Andreas Nylenna Akslen[1], Asta Kristine Håberg[1,5†] and Anne Vik[1,6†]

Table 2 Sex distribution and causes of mild traumatic brain injury by age in all 732 cases

	Age groups (years)									
	All	16–20	21–25	26–30	31–35	36–40	41–45	46–50	51–55	56–60
	N = 732	*n* = 175	*n* = 153	*n* = 87	*n* = 68	n = 46	*n* = 42	*n* = 72	*n* = 54	*n* = 35
Sex, male	62%	55%	63%	62%	65%	72%	62%	67%	59%	60%
Cause of injury n (%)										
Fall	267 (37)	51 (29)	50 (33)	29 (33)	24 (35)	15 (33)	15 (36)	34 (47)	27 (50)	22 (63)
Violence	144 (20)	39 (22)	39 (26)	21 (24)	13 (19)	11 (24)	4 (10)	9 (13)	5 (9)	3 (9)
Bicycle	98 (13)	11 (6)	14 (9)	8 (9)	12 (18)	9 (20)	7 (17)	17 (24)	11 (20)	9 (26)
Sports	81 (11)	33 (19)	25 (16)	5 (6)	4 (6)	5 (11)	5 (12)	3 (4)	1 (2)	–
MVA	83 (11)	32 (18)	9 (6)	14 (16)	6 (9)	4 (9)	5 (12)	6 (8)	6 (11)	1 (3)
Struck object	37 (5)	7 (4)	9 (6)	7 (8)	6 (9)	2 (4)	3 (7)	2 (3)	1 (2)	–
Other	9 (1)	1 (1)	3 (2)	1 (1)	2 (3)	–	–	1 (1)	1 (2)	–
Unknown	13 (2)	1 (1)	4 (3)	2 (2)	1 (2)	–	3 (7)	–	2 (4)	–

Abbreviation: *MVA* motor vehicle accidents

Journal of Neurotrauma

DOI: 10.1089/neu.2016.4919

Title:

Management of mild traumatic brain injury at the emergency department and hospital admission in Europe: A survey of 71 neurotrauma centers participating in the CENTER-TBI study

Table 1. GCS scores that are considered as mild, moderate and severe TBI

GCS score	N (%)
Mild TBI	
11-14	1 (1.5%)
12-15	1 (1.5%)
13-15	**40 (59%)**
14-15	26 (38%)

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DOI: 10.1089/neu.2016.4919
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Title:

Management of mild traumatic brain injury at the emergency department and hospital admission in Europe: A survey of 71 neurotrauma centers participating in the CENTER-TBI study

Figure 1. Frequency of ordering head CT scan in patients with mild TBI, by clinical indication

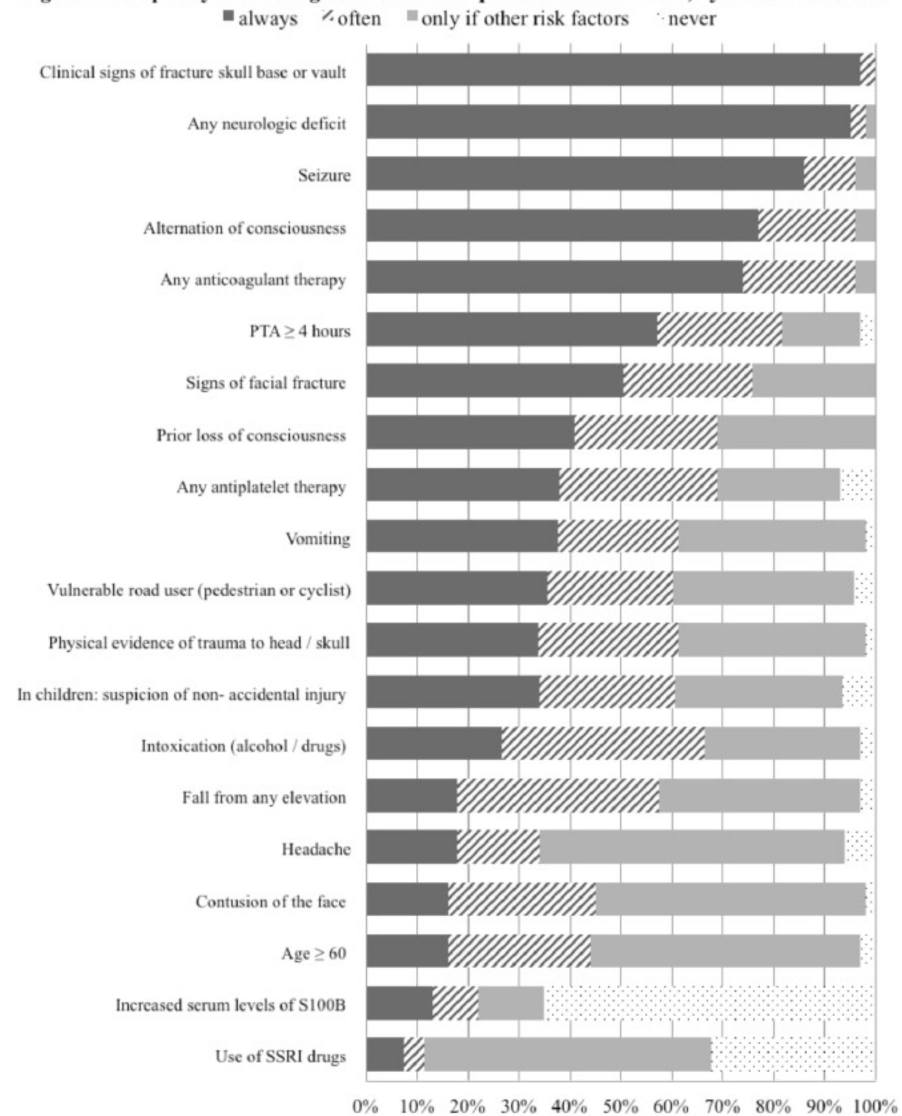

Figure 1. Frequency of ordering head CT scan in patients with mild TBI, by clinical indication

OPINION

Changing patterns in the epidemiology of traumatic brain injury

Bob Roozenbeek, Andrew I. R. Maas and David K. Menon

Roozenbeek, B. *et al. Nat. Rev. Neurol.* **9**, 231–236 (2013); published online 26 February 2013; doi:10.1038/nrneurol.2013.22

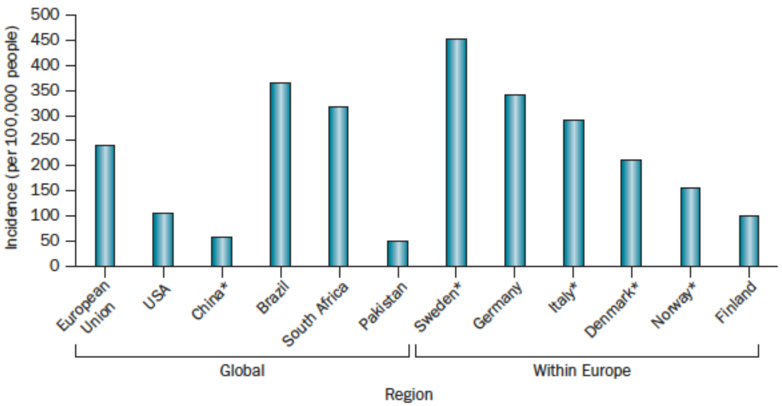

Figure 1 | Estimates of the global incidence of traumatic brain injury. *Mean of results from two studies.

Table 1 | Age of patients with TBI

Study	Year of study	*n*	Median age (years)	% of patients >50 years
Traumatic Coma Data Bank[44]	1984–1987	746	25	15
UK four-centre study[45]	1986–1988	988	29	27
European Brain Injury Consortium core data survey[46]	1995	847	38	33
Prospective Observational COhort Neurotrauma (POCON)[47]	2008–2009	339	45	43
Austrian severe TBI study[48]	1999–2004	415	48	45
Italian intensive care unit cohort[49]	1997–2007	1,478	45	44

Abbreviation: TBI, traumatic brain injury.

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Conclusions

The epidemiology of TBI has changed over time. A shift towards older age of patients with TBI has been observed, especially in high-income countries, with falls representing the primary cause of TBI among the elderly, resulting in more contusional injuries. The high incidence of comorbidities and the frequent use of platelet aggregation inhibitors and oral anticoagulants among older patients have a negative influence on outcome following TBI. This is in agreement with the observation that the overall mortality rate of patients with severe TBI has not decreased since 1990 despite evidence that introduction of evidence-based guidelines for the management of TBI has led to an overall improvement in outcome.

We recognize a great need for the development of high-quality epidemiological monitoring databases for reliable estimation of incidence, prevalence and outcome parameters. Long-term follow-up of large cohorts could provide definitive information about the cognitive consequences of acute TBI.

Sequele:
Problemi Cognitivi e di Comunicazione

- Attività Pratiche
- Memoria
- Attenzione
- Concentratione

- Problem solving
- Comprensione di linguaggio astratto
- Trovare le parole
- Expressività
- Pragmatismo

Problemi Sociali ed Emozionali

- Irritabilità
- Impulsività
- Disinibizione
- Labilità Emozionale
- Bassa Tolleranza

- Ansia
- Egocentrismo
- Mancanza di introspezione
- Depressione
- Conflitto Interno
- Comportamenti ad alto rischio

RESEARCH ARTICLE

Mild Traumatic Brain Injury (mTBI) and chronic cognitive impairment: A scoping review

Kerry McInnes[1,2], Christopher L. Friesen[1,3], Diane E. MacKenzie[2,4], David A. Westwood[2,3,5], Shaun G. Boe[1,2,3,5¤]*

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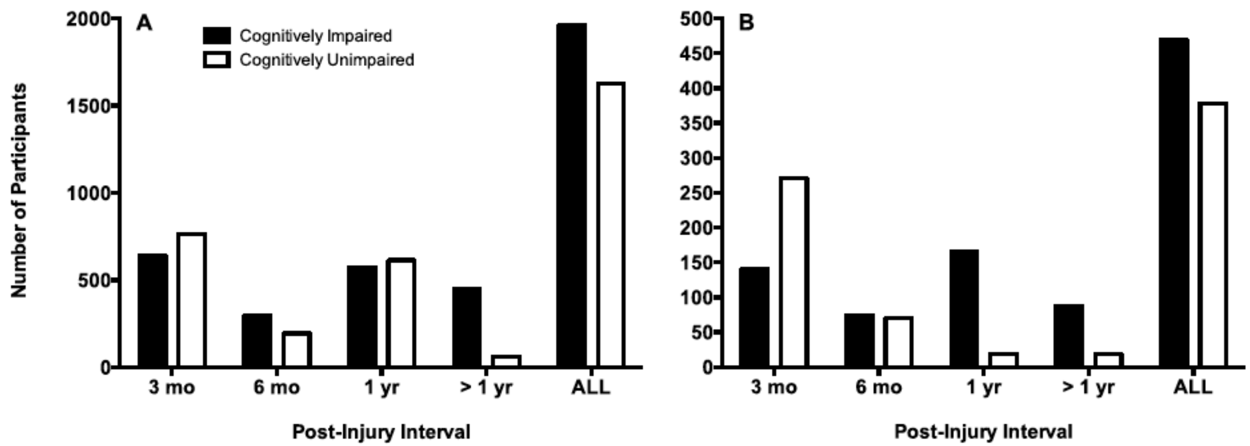


Fig 2. Incidence of cognitively impaired (black bars) and unimpaired (white bars) individuals at various time points post-injury from studies reporting cognitive outcomes using either author-supplied normative data or comparison groups (i.e., healthy or trauma controls) for the entire sample (A) and in individuals with a confirmed history of a single concussion only (B).

RESEARCH ARTICLE

Population-based cohort study of the impacts of mild traumatic brain injury in adults four years post-injury

Alice Theadom[1]*, Nicola Starkey[2], Suzanne Barker-Collo[3☯], Kelly Jones[1☯], Shanthi Ameratunga[4☯], Valery Feigin[1], on behalf of the BIONIC4you Research Group[¶]

1 National Institute for Stroke and Applied Neuroscience, Auckland University of Technology, Auckland, New Zealand, **2** Department of Psychology, University of Waikato, Knighton Road, Waikato, New Zealand, **3** Department of Psychology, University of Auckland, Auckland, New Zealand, **4** School of Population Health, University of Auckland, Auckland, New Zealand

participation. The mild-TBI sample experienced significantly increased self-reported cognitive symptoms ($F = 19.90$, $p = <0.01$) four years post-injury than controls. There were no differences between the groups for somatic ($F = 0.02$, $p = 0.89$) or emotional symptoms ($F = 0.31$, $p = 0.58$). Additionally, the mild-TBI group reported significantly poorer community participation across all three domains: productivity ($F = 199.07$, $p = <0.00$), social relations ($F = 13.93$, $p = <0.00$) and getting out and about ($F = 364.69$, $p = <0.00$) compared to controls. A regression model accounting for 41% of the variance in cognitive symptoms in TBI cases revealed a history of TBI, receiving acute medical attention and baseline cognitive symptoms, sleep quality, anxiety and depression were predictive of outcome. The results indicate that whilst somatic and emotional symptoms resolve over time, cognitive symptoms can become persistent and that mild TBI can impact longer-term community participation. Early intervention is needed to reduce the longer-term impact of cognitive symptoms and facilitate participation.

Clinical Journal of Sport Medicine, 11:23–31

Neuropsychological Test Performance Prior To and Following Sports-Related Mild Traumatic Brain Injury

Ruben J. Echemendia, PhD, Margot Putukian, MD, R. Scott Mackin, MS, Laura Julian, MS, and Naomi Shoss

Department of Psychology, The Pennsylvania State University, University Park, Pennsylvania, U.S.A.

Conclusions: Neuropsychological tests are useful in the detection of cognitive impairment following mTBI. The test data appear to be more effective than subjective report of symptoms in differentiating between injured and noninjured athletes at 48 hours postinjury. Although significant individual variability existed, most injured athletes recovered within 1 week of injury. A battery of tests, rather than any single test, is necessary to capture the variability that exists among injured athletes.

Pochi gg di esperienza…

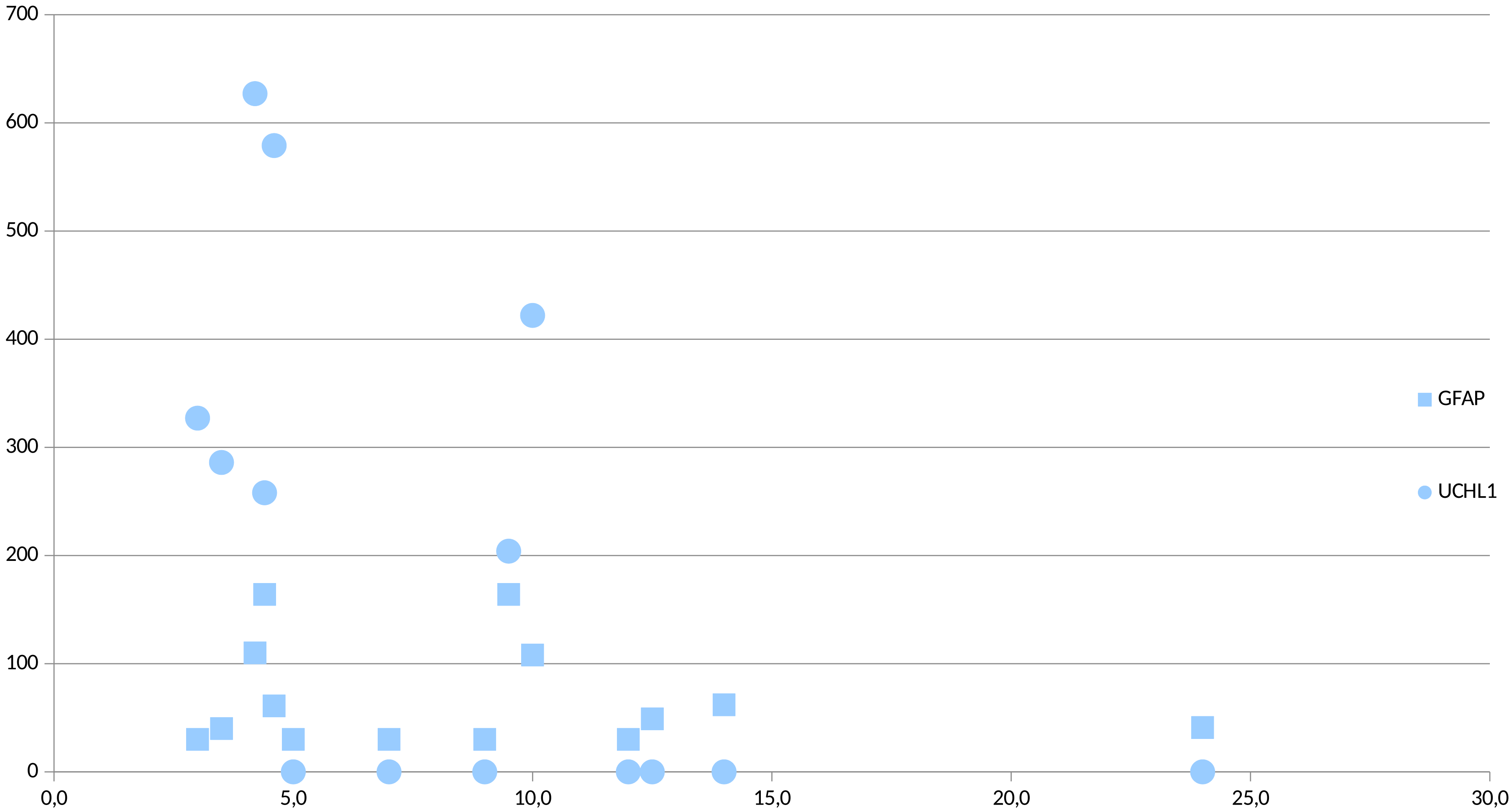
Casistica OM

Età	Ore trauma -prelievo	GCS	Uso di anticoagulanti	Uso di antiaggreganti	Risultato mTBI Plasma test	Referto TC
26	3	14	No	No	Non Elevato	Negativo
70	3	15	No	Si	Elevato	Negativo
18	4	15	No	No	Elevato	Negativo
80	4	15	No	No	Elevato	Negativo
86	4	15	No	No	Elevato	Negativo
14	5	15	No	No	Elevato	Negativo
42	7	15	No	No	Non Elevato	Negativo
79	9	15	No	No	Non Elevato	Negativo
54	9	15	No	No	Elevato	Positivo
84	10	14	No	No	Elevato	Negativo
69	12	15	No	No	Non Elevato	Negativo
70	12	15	No	Si	Elevato	Negativo
46	14	15	No	No	Elevato	Negativo
78	24	15	No	Si	Elevato	Negativo

22	1	15	No	No	Elevato	Negativo
38	1	15	No	No	Elevato	Negativo
87	6	15	No	No	Elevato	Negativo

Età	Ore trauma -prelievo	GCS	Uso di anticoagulanti	Uso di antiaggreganti	Risultato mTBI Plasma test	Referto TC
14	5	15	No	No	Elevato	Negativo
18	4	15	No	No	Elevato	Negativo
46	14	15	No	No	Elevato	Negativo
54	9	15	No	No	Elevato	Positivo
70	3	15	No	Si	Elevato	Negativo
70	12	15	No	Si	Elevato	Negativo
78	24	15	No	Si	Elevato	Negativo
80	4	15	No	No	Elevato	Negativo
84	10	14	No	No	Elevato	Negativo
86	4	15	No	No	Elevato	Negativo
26	3	14	No	No	Non Elevato	Negativo
42	7	15	No	No	Non Elevato	Negativo
69	12	15	No	No	Non Elevato	Negativo
79	9	15	No	No	Non Elevato	Negativo

Casistica OM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