

Resumption of professional aeronautical activity after spinal surgery in aircrew

Reprise de l'activité aéronautique professionnelle
après chirurgie rachidienne chez les personnels navigants



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Disclosure Information

We have no financial relationships to disclose



Introduction

- **Preponderance** of spinal pathologies
- Environmental impact and aeronautical activities
- Different pathologies : traumatic, degenerative
- Different treatments : medical, **surgical**

Bibliography

- 1) Gourmelen J, Chastang J-F, Leclerc A et Ozguler A. Fréquence des lombalgies dans la population française de 30 à 64 ans. Résultats issus de deux enquêtes nationales. Ann Réadapt Médecine Phys. Nov 2007;50(8):633-9.
- 2) Leguay G, Metges PJ, Leger A. Problèmes d'aptitude posés par la pathologie vertébrale chez le personnel navigant de l'aéronautique. Med Aéro Spat, Tome XXII, N°86 ; 1983.
- 3) McIntosh G, Hall H, and Melles T. The incidence of spinal surgery in Canada. Canadian Journal of Surgery 41, n° 1 (Fev. 1998): 59-66.
- 4) Rahman S, Frilander H, Sainio M, Karvala K, Sovelius R, Vehmas T and Viikari-Juntura E. Cervical and Lumbar Pain and Radiological Degeneration among Fighter Pilots : A Systematic Review and Meta-Analysis. *Occupational and Environmental Medicine* 72, n° 2 (Fev. 2015): 145-50.
- 5) Montgomery W, Sato M, Nagasaka Y and Vietri J. The economic and humanistic costs of chronic lower back pain in Japan. *ClinicoEconomics and Outcomes Research* Volume 9 (1 June 2017): 361-71.

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Surgical Treatment

→ What about medico-aeronautical consequences ?

- * **Fitness/Resumption of activity ?**
- * **Deadlines ? Limitations ? Weavers ?**
- * **Reconversion (ex. : to fly on another aircraft) ?**
- * **Total Unfitness ?**

Study

1 - Method

Prospective descriptive pan-centric study

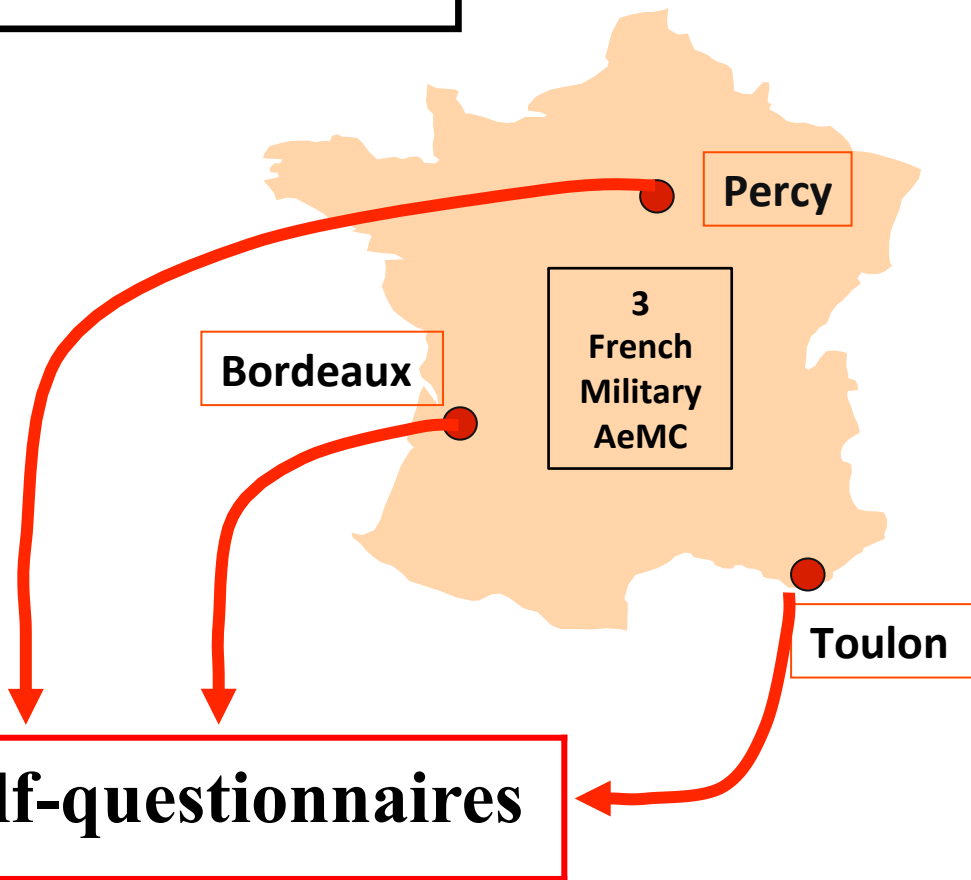
Approval by the Ethical Committee of Sainte-Anne Military Hospital
Toulon, January 30, 2017

January to April 2017

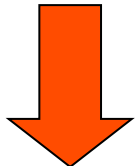
Any **professional** aircrew

Renewal of the medical certificate

Any civil or military aviation duty




1,500 anonymous self-questionnaires



1,418 duly completed and returned (94.5 %)

- **Main objective**

 To evaluate the spinal surgery impact on the resumption to the aeronautical activity for the Aircrews suffering from a spinal pathology

- Primary judgment criterion

→ Aeronautical activity resumption

2 - Results

AeMC Bordeaux
AeMC Paris
AeMC Toulon

1,500 questionnaires

82 not exploitable

1,418 exploitable

33 %

468 asymptomatic
Aircrews (AC)

950 spinal pain AC

67 %

2.75 %

of 1,418 AC



39 spinal surgery

4.1 %

of 950 spinal painful AC



AeMC Bordeaux
AeMC Paris
AeMC Toulon

1,500 questionnaires

82 not exploitable

1,418 exploitable

33 %

468 asymptomatic
Aircrews (AC)

950 spinal pain AC

67 %

95.9 %

of 950 spinal painful AC

2.75 %

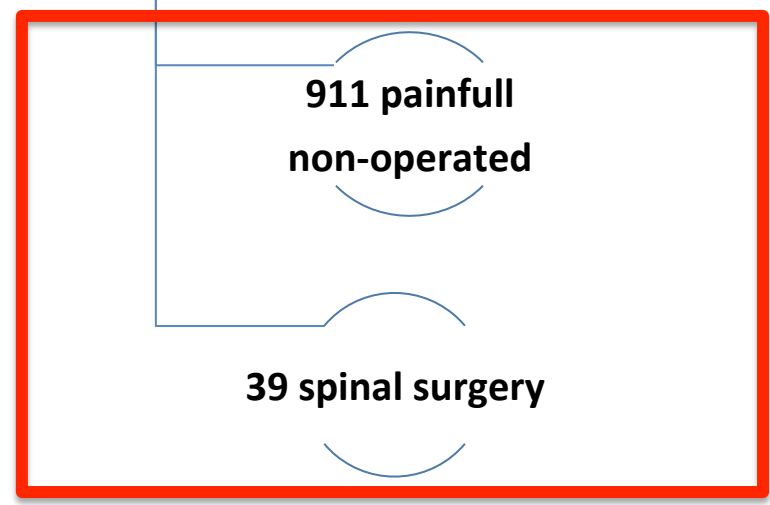
of 1,418 AC

4.1 %

of 950 spinal painful AC

**911 painfull
non-operated**

39 spinal surgery



POPULATION

950 spinal pain AC

39 painfull operated AC

- **Sex-ratio (M/F) : 38**
- **Mean age : 49 years**
- **Mean weight : 82 kg**
- **Mean height : 175.4 cm**

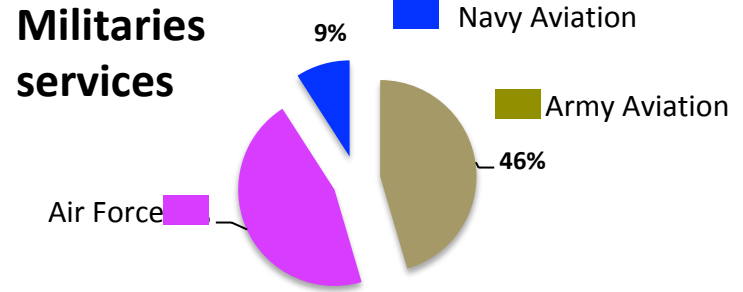
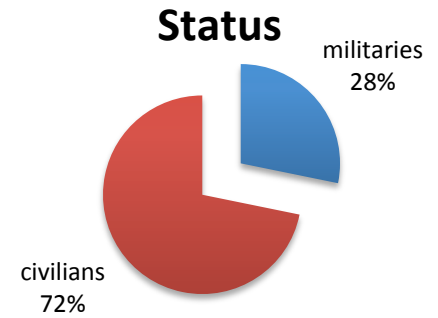
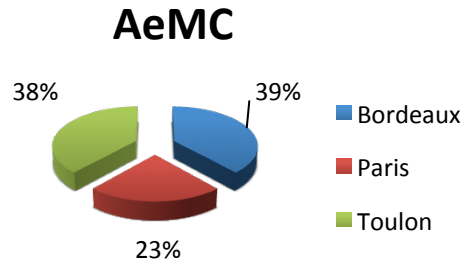
911 painfull non-operated AC

- **Sex-ratio (M/F) : 6**
- **Mean age : 43 years**
- **Mean weight : 77 kg**
- **Mean height : 177.0 cm**

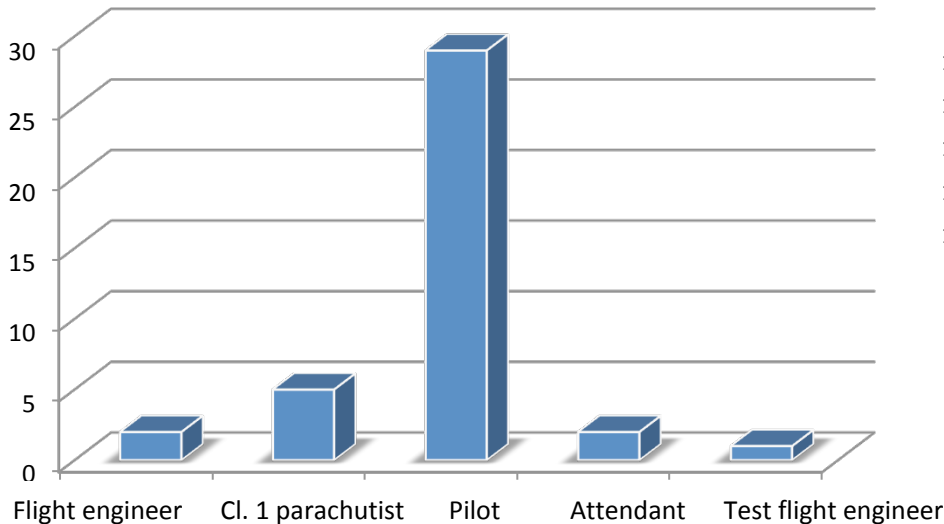
Statistical tests used : Shapiro-Wilk, Student T test or Student T test paired, Mann and Whitney or sum test of Wilcoxon values, Chi2 test (Yates or Mc Nemar)

39 painfull operated AC

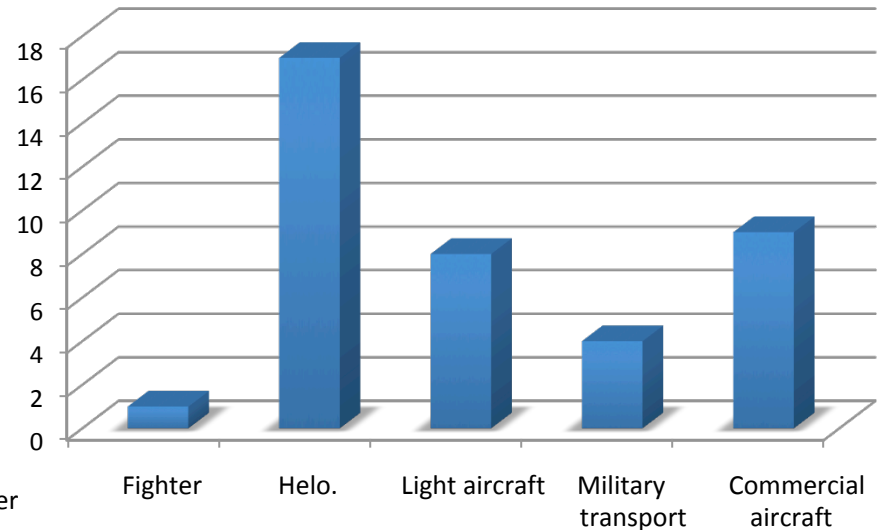
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- Mean age : 49 years
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Duties



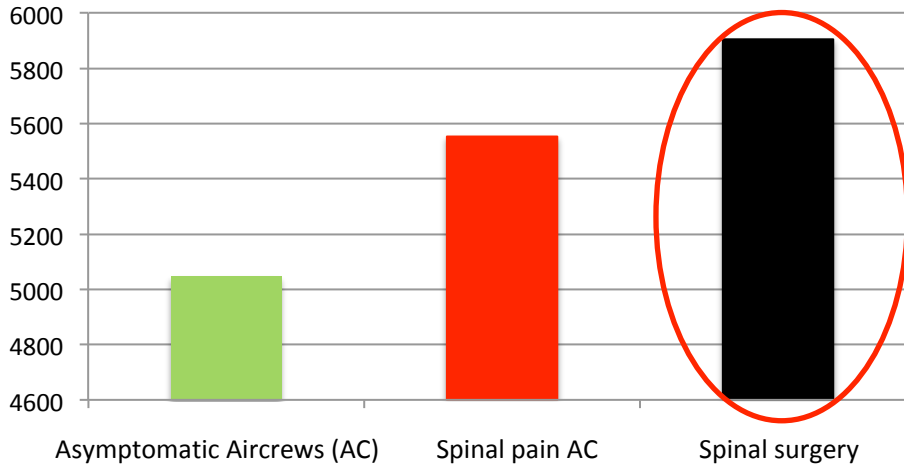
Flight activity



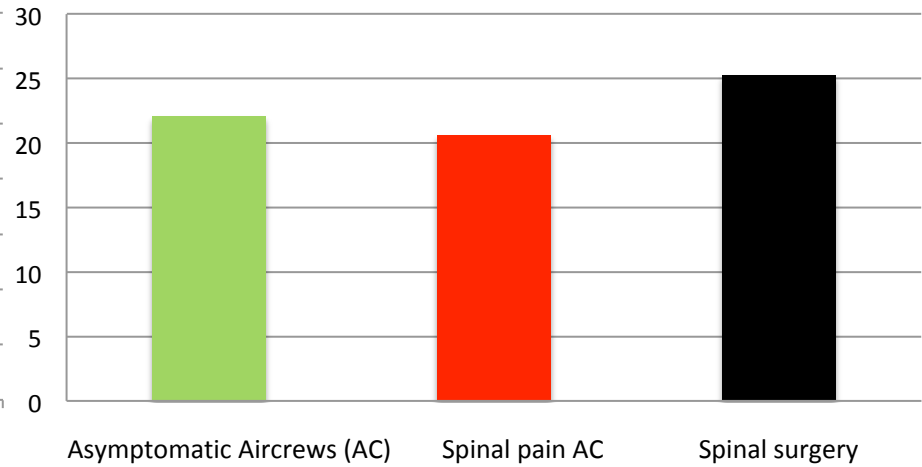
Characteristics of the 3 populations

Total flying hours

$P < 0,05$

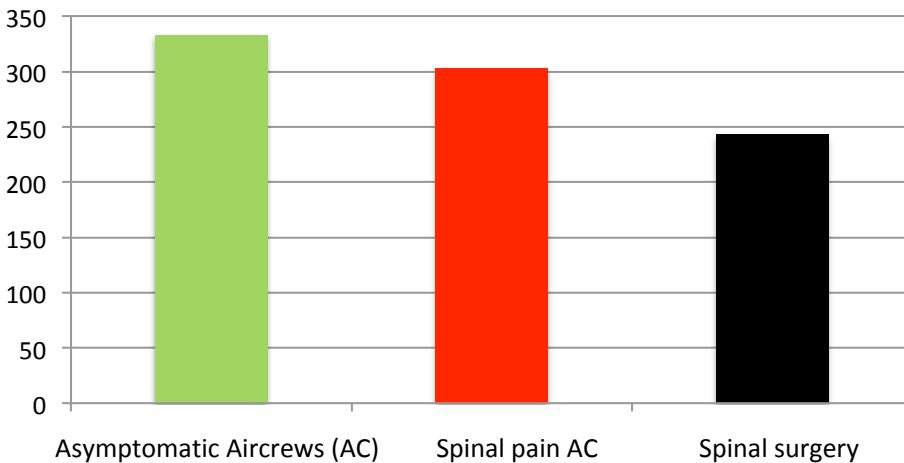


Flight seniority

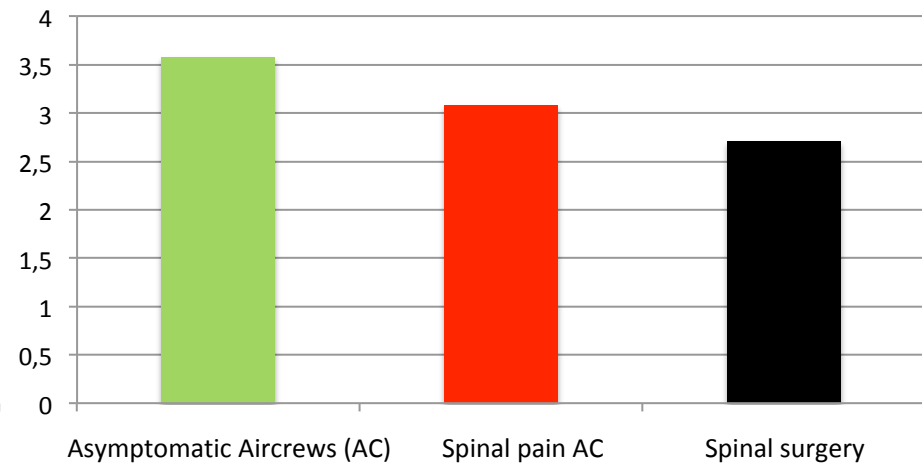


Annual flying hours

Current activity

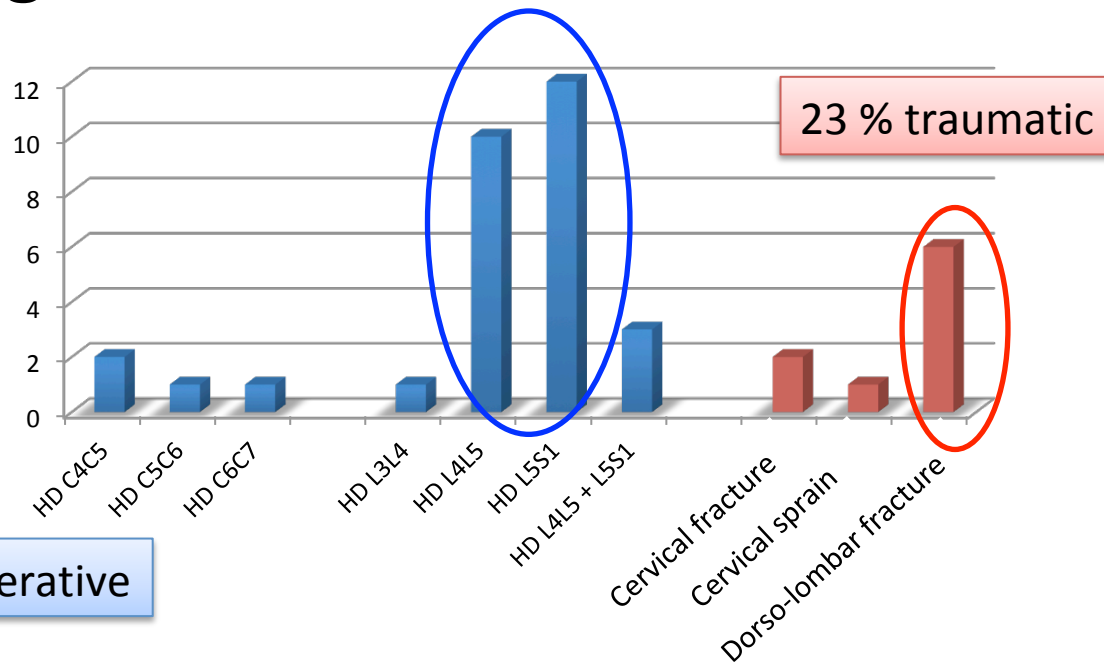


Mean flights length



Spinal surgery

- Mean delay : 12 years (1 - 27)
- Pathologies:



HD : herniated disc

77 % degenerative

Spinal surgery and flight activities

- ➡ Return to flight : 19 weeks (4 – 54)
- ➡ Fitness impact : 13 %

POPULATION

950 spinal pain AC


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911 painfull non-operated AC

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 **match 1 to 3 by performing a propensity score** because of too much heterogeneity of the epidemiological data collected and the too large number of patients in the group of unoperated pain versus painful surgery

MATCHING

950 spinal pain AC



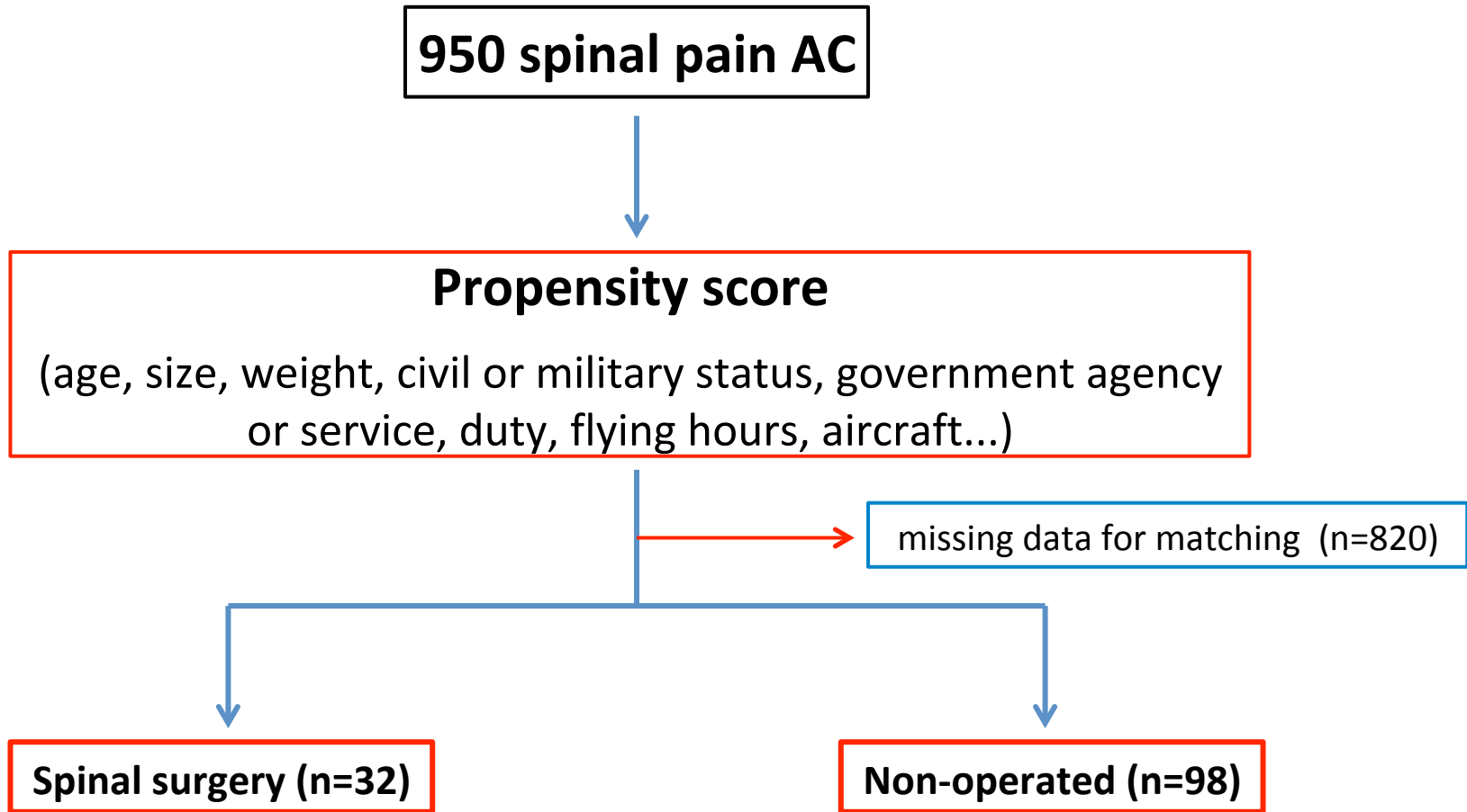
Propensity score

(age, size, weight, civil or military status, government agency or service, duty, flying hours, aircraft...)

missing data for matching (n=820)

Spinal surgery (n=32)

Non-operated (n=98)



Aircrews with spinal surgery = 4 times more risk to involve aeronautical fitness

(OR=4,02 ; IC95% (1,25; 12,96), p=0,019)

 flight retraining

 waiver and/or fit assessment by licensing authority

... In the bibliography

- 1) Vallejo DD, Benadives EJ. Surgical correction of disc pathology in fighter pilots : a review of 14 cases. Aviat Space Environ Med. 2007; 78:784–8.

14 Fighter pilots, Spanish Air Force

Symptomatic herniated discs, 12 arthrodesis + 2 discectomy

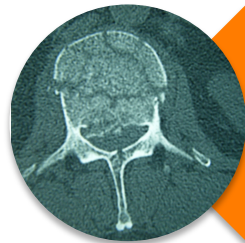
ALL FIT : return with waiver to **fighter aircraft** duties
(6.9 and 5.6 months after surgery)

- 2) Taneja N. Degenerative Disc Disease Treated Surgically in Aircrew: The IAF Experience. Ind J Aerospace Med. 2014; 58(1): 1-7

18 pilots, Indian Air Force

ALL FIT, but 2 reconversions (to fly on another aircraft)

Reflections on trauma ...



Closed trauma



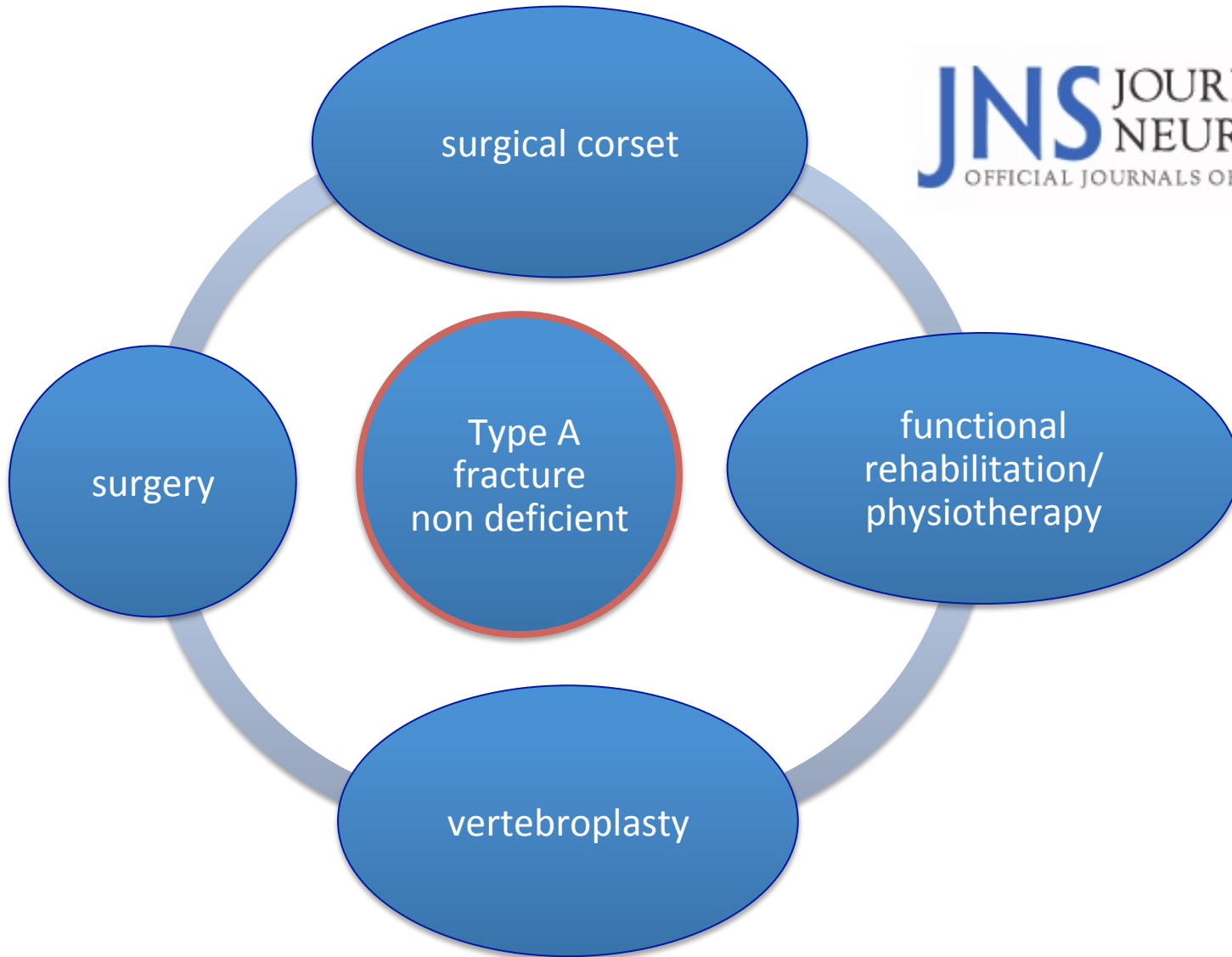
Open trauma

Lack of consensus

	North America	Europe	Asia	Australia - NZ
Case 4: L1 Burst fracture				
A body cast	4%		22.73%	
A thoracolumbar brace	64%	16.67%	13.64%	50%
Posterior surgery	32%	50%	31.82%	33.33%
Anterior surgery		8.33%	9.09%	16.67%
Combined anterior and posterior surgery		25%	22.73%	
Case 5: L2 flexion distraction injury				
A thoracolumbar brace		7.69%	10.00%	
Posterior surgery	96.43%	76.92%	70%	100%
Anterior surgery			5%	
Combined anterior and posterior surgery	3.57%	15.38%	15%	
Case 6: T9 osteoporotic compression fracture				
No treatment	7.69%			50%
Medical pain management	69.23%	25%	60%	
Hospitalization if her pain is severe			40%	
Optimal medical treatment of her osteoporosis	7.69%			
Vertebroplasty	15.38%			50%
Kyphoplasty		75%		
Case 9: T5 complete ASIA A paraplegia				
Posterior surgery	78.26%	62.50%	80%	57.14%
Anterior surgery	13.04%	12.50%	5%	14.29%
Combined anterior and posterior surgery		12.50%	15%	
Other	8.70%	12.50%		28.57%

Lenehan B, Dvorak MF, Madrazo I, Yukawa Y, Fisher C
Diversity and commonalities in the care of spine trauma internationally.
Spine (2010); 35:S174-179.

Reflections on trauma ...



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Operative and nonoperative adverse events in the management of traumatic fractures of the thoracolumbar spine: a systematic review

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Conclusions. Due to the limited number of high-quality studies, conclusions related to complication rates of operative and nonoperative management of thoracolumbar traumatic injuries cannot be definitively made. Further prospective, randomized studies of operative versus nonoperative management of thoracolumbar and lumbar spine trauma, with standardized definitions of complications and matched patient cohorts, will aid in properly defining the risk-benefit ratio of surgery for thoracolumbar spine fractures.

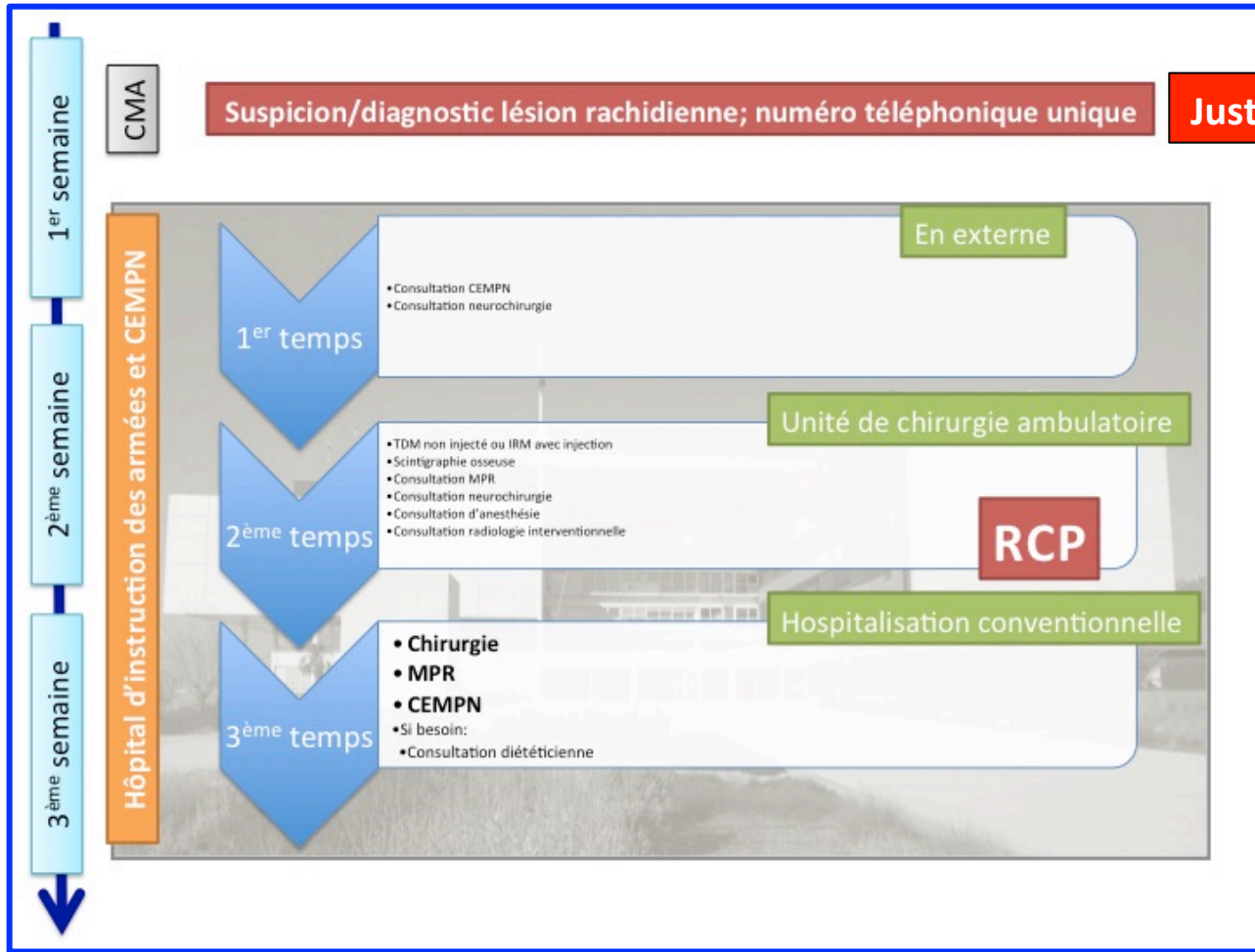
Setting up a therapeutic path

For the moment at the level of our recruitment (South East of France and French Fly Navy), especially for the militaries

Squadron

Militaries hospitals
(Brest, Lyon, Marseille, Toulon)

Multi disciplinary consultation
Including aviation medicine



Objective : to ensure the best therapeutic management compatible with the continuation of the aeronautical activity/fitness

**Thank you
for your attention**

Question(s) ?

The First
ICASM + ECAM +
AsMA (= ICAM)
is coming soon ...
in FRANCE
(September 24-26,
2020, Paris)