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**


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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
January to April 2017

Any professional aircrew

Renewal of the medical certificate

Any civil or military aviation duty

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

Prospective descriptive pan-centric study

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
1,500 questionnaires

82 not exploitable

1,418 exploitable

468 asymptomatic Aircrews (AC)  950 spinal pain AC

33%  67%

2.75% of 1,418 AC  39 spinal surgery

4.1% of 950 spinal painful AC
1,500 questionnaires

- 82 not exploitable
- 1,418 exploitable

468 asymptomatic Aircrews (AC)

- 33% of 1,418 AC

950 spinal pain AC

- 67% of 950 spinal pain AC

- 911 painful non-operated
- 39 spinal surgery

- 95.9% of 950 spinal painful AC

- 2.75% of 1,418 AC

- 4.1% of 950 spinal painful AC
POPPULATION

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

• Sex-ratio (M/F) : 38
• Mean age : 49 years
• Mean weight : 82 kg
• Mean height : 175.4 cm
Characteristics of the 3 populations

### Total flying hours

- **Asymptomatic Aircrews (AC)**: 5000
- **Spinal pain AC**: 5400
- **Spinal surgery**: 5600

*P < 0.05*

### Flight seniority

- **Asymptomatic Aircrews (AC)**: 30
- **Spinal pain AC**: 25
- **Spinal surgery**: 20

### Annual flying hours

- **Asymptomatic Aircrews (AC)**: 350
- **Spinal pain AC**: 300
- **Spinal surgery**: 250

### Mean flights length

- **Asymptomatic Aircrews (AC)**: 3.5
- **Spinal pain AC**: 3
- **Spinal surgery**: 2.5

**Current activity**
Spinal surgery

• Mean delay: 12 years (1 - 27)

• Pathologies:

- 77% degenerative
- 23% traumatic

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

39 painfull operated AC

- Sex-ratio (M/F) : 38
- Mean age : **49 years**
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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
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


**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)


**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
<table>
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<tr>
<th>Case 4: L1 Burst fracture</th>
<th>North America</th>
<th>Europe</th>
<th>Asia</th>
<th>Australia - NZ</th>
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<tbody>
<tr>
<td>A body cast</td>
<td>4%</td>
<td>16.67%</td>
<td>22.73%</td>
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<tr>
<td>A thoracolumbar brace</td>
<td>64%</td>
<td>50%</td>
<td>31.82%</td>
<td>33.33%</td>
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<tr>
<td>Posterior surgery</td>
<td>32%</td>
<td>8.33%</td>
<td>9.09%</td>
<td>16.67%</td>
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<tr>
<td>Anterior surgery</td>
<td></td>
<td>25%</td>
<td>22.73%</td>
<td></td>
</tr>
<tr>
<td>Combined anterior and posterior surgery</td>
<td>64.25%</td>
<td>15%</td>
<td>100%</td>
<td>15%</td>
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<table>
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<tr>
<td>Posterior surgery</td>
</tr>
<tr>
<td>Anterior surgery</td>
</tr>
<tr>
<td>Combined anterior and posterior surgery</td>
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<th>Case 6: T9 osteoporotic compression fracture</th>
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<td>No treatment</td>
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<tr>
<td>Medical pain management</td>
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<td>Hospitalization if her pain is severe</td>
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<tr>
<td>Optimal medical treatment of her osteoporosis</td>
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<td>Kyphoplasty</td>
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<th>Case 9: T5 complete ASIA A paraplegia</th>
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<tr>
<td>Anterior surgery</td>
</tr>
<tr>
<td>Combined anterior and posterior surgery</td>
</tr>
<tr>
<td>Other</td>
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**Lenehan B, Dvorak MF, Madrazo I, Yukawa Y, Fisher C**

**Diversity and commonalities in the care of spine trauma internationally.**

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

George M. Ghobrial, M.D., Christopher M. Maulucci, M.D., Mitchell Maltenfort, Ph.D., Richard T. Dalyai, M.D., Alexander R. Vaccaro, M.D., Ph.D., Michael G. Fehlings, M.D., Ph.D., F.R.C.S.C., John Street, M.D., Ph.D., Paul M. Arnold, M.D., and James S. Harrop, M.D.

Department of Neurological Surgery, Thomas Jefferson University Hospital, Philadelphia; Rothman Institute, Philadelphia, Pennsylvania; University Health Network, Toronto, Ontario; University of British Columbia, Vancouver, British Columbia, Canada; and University of Kansas, Kansas City, Kansas

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

**Objective**: to ensure the best therapeutic management compatible with the continuation of the aeronautical activity/fitness
Thank you for your attention

Question(s) ?