

# Techniques for Potential Improvement Intervention for the Prevention of Bruxism Among French Military Aircrews

Sir

During flights, aircrews must cope with environmental constraints. An inadequate response to these demands, called stress, can involve a deleterious impact on health, especially on teeth with bruxism. Bruxism can be defined as masticatory movements' disorders characterized by grinding and/or clenching of the teeth. These movements must be repetitive, unintentional and unconscious, without any functional objective. This phenomenon is associated with abnormal tooth wear and discomfort or pain in jaw muscles. Twenty to 30% of the civilian general population suffer from diurnal bruxism [1].

The incidence of bruxism in pilots is 57-69% [2,3] and varies between pilot types. In fighter pilots it is 57-60% and 61-66% in helicopter pilots [2,3]. The incidence in Air Force officers but non-aircrew members is the same as that of the general population (27% v 20-30%) [1,2] suggesting that being a pilot is a significant risk factor for bruxism. Excessive occlusal forces could be associated with the tension of masticatory muscles when counteracting the effects of flight manoeuvres [2].

Military flying is stressful even during peacetime and stress represents a 'general adaptation syndrome' as a link between environmental constraints and the ability of an individual to cope with them. The relevance and efficiency of the pilots' coping strategies to return to the equilibrium in the face of external stressors determines the physiological consequences of those constraints.

Bruxism is not the consequence of stress as a constraint, but as a defective adaptation to it. Israeli and Indian studies show [2,3] that pilots suffering from bruxism are those who set up the less efficient coping strategies with a more emotional approach and an avoidance of the constraint. Alternatively, non-bruxing pilots build more rational coping strategies.

To overcome the deleterious consequences of teeth grinding and clenching, pilots must develop effective coping strategies for dealing with occupational stress. In 1990, the French Armed Forces implemented the Techniques for Potential Improvement (TOP) programme, a set of physical and mental strategies which allow everyone to call upon their full physical and psychological resources. TOP were developed by the Human Factors department

at the French military institute of biomedical research (IRBA). These techniques, initiated by the joint service military school, are based on the psychological training of sportsmen [4]. These means vary according to the situational demands and appeal to basic processes of breathing, relaxation and mental imagery.

In order to validate these techniques, a study on French military pilots of Mirage 2000 was conducted before their deployment to Afghanistan in 2009. Results before and after deployment, based on psychological, physical and biological parameters, clearly indicate the positive impact of TOP on pilots [5]. TOP are currently employed in all services (Navy, Air Force and Army).

Military personnel must endeavour to decrease the frequency of bruxism. To make this possible, they and aircrews in particular, need to learn how to react effectively and in an adapted way to any stressful situation and we suggest that in addition to traditional training, TOP could be introduced in a similar way to French military pilots' training.

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# Acute Spinal Epidural Haematoma Causing Cord Compression after Chiropractic Neck Manipulation: An Under-recognised Serious Hazard?

I was interested to read the case report about acute spinal epidural haematoma [1].

Neurological complications after chiropractic manipulation as the authors say are rare and must be weighed against the excellent relief afforded for the vast majority of patients. It would be interesting to know what form the manipulation took to give rise to the problem described.

I note the patient presented with no power in his right upper limb (MRC Grade 0) and cranial nerves were normal. With the severe degree of neurological impairment this would normally indicate a lesion in the region of the cervical spine. One would normally advise an MR scan of the cervical spine rather than the head.

Of particular concern is that surgery was delayed for seven days after first presenting in the Accident and Emergency Department. Although they quote a paper in which non-operative management is discussed, it is a brave surgeon who delays spinal cord decompression. It has been well shown that patients who had surgery within twelve hours had better neurological outcome [2].

It is quoted that the source of bleeding was discovered to be a torn epidural vein. In my experience at that time, a week after the event, one finds yellow staining within the epidural space with a combination of liquid and solid clot but the vessel causing the bleed is not obvious. It also mentions that the cord was 'lavaged'. I am not certain what this means since the haematoma was in the epidural space. I would have thought that the spinal cord was not

and should not have been visualised.

I was pleased to read that he had made a good recovery but had symptoms of mild causalgia affecting the legs. Causalgia is a very troublesome symptom that is very difficult to treat and probably would have been avoided by earlier surgery. It would be interesting to know whether spinal cord motor function has returned to normal, whether he is able to run normally and whether he is able to hop on tiptoes.

The authors mention that a full and comprehensive history and assessment of every patient should be made before performing neck manipulations. I find it difficult to see how such procedures would have predicted a haemorrhage in this unfortunate man's case.

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## Reference

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## Authors Reply

Sir

We entirely agree with the questions raised by Lt Col Stanworth regarding the management of a patient with an epidural haematoma [1]. Upon admission, we reported that the patient was initially managed under the medical team and was not referred through to the orthopaedic service until Day six. He was investigated and managed by the general medical consultant as a cerebrovascular accident and was subsequently referred to a consultant neurologist who arranged for the MRI scans of firstly the brain and then the spinal cord. We were informed immediately once the results of the cervical spine scan became available and by this stage at six days down the line, delaying one further day to get adequate staff and a theatre list in place did not seem inappropriate.

Intraoperatively we found a large organised clot which once removed revealed the dura and significant bleeding from an epidural vein. Obviously, it is difficult to know whether this was the initial cause of the patient's symptoms but it was certainly bleeding significantly once the clot had been removed and the tamponade effect removed. The spinal cord was not visualised but the dura was lavaged and the clot removed.

The patient was finally reviewed at one year following the initial event. At this stage, in his own words, he had returned to normal function. He was aware of some discomfort but no reduction in function but I did not test whether he could run or hop on tiptoes.

I agree that taking a history and making a full assessment of each patient is unlikely to have prevented this gentleman's unfortunate incident and from our local point of view, the incident has also led to some re-education of the medical staff.

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