

## Airsickness : Morbidity patterns and preventive strategies in trainee pilots

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Airsickness (AS) is a common aeromedical problem of ab-initio flying training. It is an important cause of aircrew rejection at Flying Training Establishments. This paper reviews the incidence and etiology of AS among Flt Cdt's during 1996-1998 at BFTS. A total of 52 aircrew suffered from AS during stage I of flying training imparted on HPT-32, an incidence of  $18.5 \pm 2\%$ . Various contributory factors having a bearing on problem of AS and management strategies have been discussed. The beneficial effects of these measures when used in combination, and before the onset of AS have been highlighted.

**Keywords:** Flying training, yogic exercise, vestibular desensitisation.

**M**otion sickness is a functional disability that may occur as airsickness among ab-initio trainee pilots. These conditions are normal physiological response that occurs in an unadapted individual when exposed to abnormal motion environment. On exposure to nonintegrable kinematic information, individual manifests certain signs and symptoms, which are a built-in protective response to a typical motion environment [1].

Airsickness (AS) is the most common cause of suspension of trainee pilots from flying training. Its incidence may be as high as 30-40% initially at Flying Training Establishments (FTEs). Subsequently, it reduces spontaneously after 3-4 sorties. Certain trainee pilots who fail to adapt successfully to inflight environment, need withdrawal from flying and medical intervention. AS may also indirectly contribute to trainee's failure to learn flying, when adaptation

is incomplete. Fortunately, this physiological malady is potentially manageable and possibly avoidable.

### Materials and methods

The present study has been conducted at FTE - Basic Flying Training School (BFTS), where stage I flying training is imparted to Flight cadets (Flt Cdt's) on HPT-32. The experimental group comprised of 281 Flt Cdt's who were routed to BFTS in five pilot courses (158-162 PC) Jan 96 till Jun 98. All Flt Cdt's were males, ex-NDA, or direct entry, with average age of 21 years. All were in full flying category AIG1. Prior to commencement of flying training they were medically examined on AFMSF-3 and interviewed to elicit any past history of motion

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sickness and assess attitude and motivation towards flying. Records of morbidity patterns of previous courses formed the control group.

The Flt Cds were explained about the specific measures to overcome AS. They were demonstrated procedure and implications of Physical Exercise Therapy (PET). The regime consisted of 3 vertigo inducing exercises and one yogic posture - *sarvangasana* as introduced by Deshmukh et al at AirForce Academy in 1983 [2]. The Flt Cds were made to do these vestibular desensitisation exercises thrice daily, till they were able to overcome AS. Subjective symptoms were recorded on a Subjective Unit of Discomfort Scale (SUDS).

This is a rating scale ranging from 0 to 100%, to evaluate the progress in each case. In addition, the Flt Cds were also indoctrinated about general measures such as diet, harness fitness, maintenance of visual reference point, avoidance of anxiety and drugs, to overcome the problem of AS.

**Results:** AS incidence in the experimental and control groups was  $18.5\% \pm 2.0\%$  (52/281) and 35.0% respectively showing reduction of 37.14%. Of the 52 cases, 6 (11.3%) had intractable AS warranting temporary withdrawal from flying. These cases were managed with psychological counselling and yogic exercises in addition to PET. All of these showed significant improvement and were successfully able to complete flying without loss of terms, except for one Flt Cdt. He was referred to 2 AMTC for further management and was successfully reflighted with the next course.

Thus, the suspension rate from flying training due to AS was almost nil in experimental group, as compared to 4.6% in the control group, when no preventive measure to AS was instituted.

There were a number of factors observed to contribute and influence the development and outcome of AS in these trainee pilots. Presence of past history of motion sickness in the airsick cadets was observed to be highly significant ( $P < 0.01$ ). Amongst the aircraft related factors, presence of fuel smell in the cockpit of HPT-32 also contributed to causation of AS. There was no aircrew morbidity or wastage observed which could be attributed to psychological factors like excessive anxiety, lack of motivation, fear of flying, phobia of heights or closed spaces or poor instructor-pupil relationship.

## Discussion

Airsickness is a major problem in any FTE. Its incidence has been reported from 30%-40% amongst ab-initio pilots by various authors, depending upon the criteria used for its estimation. Dobie reported the incidence of AS in RAF as 38.7% out of which 24.1% were mild and 14.6% severe [3]. In IAF, the incidence of AS has been estimated to be 9% between 1983 to 1993 in FTE [4].

Economic consequences of suspension during flying training due to AS can be substantial, besides loss of time and effort. The amount spent on training of a fully operational pilot in IAF is as follows:

Combat Pilot	-	Rs. 5.16 crores
Transport Pilot	-	Rs. 2.26 crores
Helicopter Pilot	-	Rs. 1.49 crores

The cost of disqualifying a pre-solo trainee pilot can be over Rs. 12 lacs [5].

Fortunately, the problem of AS can be managed successfully to a great extent and its

economic consequences mitigated. There are several non-pharmacological and ground based management strategies available that have been used with highly encouraging results.

*Vestibular desensitisation therapy*, suppresses the hypersensitivity to AS and the way disintegrable signals are processed in the sensory organs. The graded exposure to provocative stimuli brings about complete adaptation to etiological processes causing AS. Certain exercises familiarize the subjects with negative G effects with shifting of abdominal muscles upwards as experienced during descent. The PET programme for prevention of AS is highly cost effective and practical to comply with during flying training.

*Yogic exercises* have been used prophylactically with reduction of 48.5% in incidence of persistent AS. This schedule consists of *Surya Namaskara, sithilikarna, pranayama, padmasana*, etc for 45 minutes, thrice a week, till completion of basic flying training. Benefits from Yoga accrue from its effects on autonomic nervous system and reducing sympathetic activity towards better adjustment to aviation stresses [6]. However, yoga should not be practised beyond certain limits, since it may blunt sympathetic drive in combat pilots.

*Biofeedback applications, behaviour and cognitive modification measures* have been employed to supplement above management therapies to overcome AS. These techniques aim to reduce AS by acquiring muscle relaxation and diaphragmatic breathing. Modified Jacobson Progressive Relaxation Therapy is a technique

which induces deeper muscle relaxation with mental image to tolerate most stressful situation with least discomfort. The trainee pilot is better aware of his internal processes and equipped to attain control over them.

### Conclusion

Air sickness is a major medical problem in any FTL causing significant loss of flying time effort and with serious economic consequences. Since it is potentially manageable, all efforts should be made to consider various aspects related to it. Effective AS desensitisation can be achieved with PET. However, it is believed that combination of management strategies and institution of these therapies from the very outset of basic flying training shall reduce the problem to very insignificant levels.

### References

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