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| Thesis Title | Factors Influencing Hand Oscillation During Target Aiming |
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## ABSTRACT

This research studied the factors influencing hand oscillation during target aiming. The stabilimeter was used for determining the hand steadiness. Sedentary 9 male subjects (mean age: 22.56 yr.), who were classified as pure dextrals (right-hand, right-eye dominant) were asked to aim at the hole target by holding the wooden gun and inserting the stainless steel probe at the top end of the barrel into the hole of the stabilimeter without touching the rim of the hole. The errors as a result of the probe touching the rim was recorded by a physiograph. Instantaneous heart rates and respiratory rate were also recorded by the same machine. From the data obtained we can summarized as in the followings:

1. Aiming with self-right eye closing (Rtcl) caused significantly greater hand oscillation than aiming with both eyes, self-left eye closing (Ltcl), and the eye closing by object eye covering (Rtco and Ltco); while heart rate and respiratory rate had mostly no significant changes.

2. Hand oscillation in the aiming with the non-preferred hand tended to be higher than that in the aiming with preferred one. Aiming in the supported positions, particularly holding the gun in the non-preferred hand and supported by the dominant one (Left hand in the right palm), caused hand significantly

steadier than the non-supported positions (holding the gun with right or left hand alone).

3. Aiming during the left or right knee kneeling and the prone positions increased the hand instability greater than that of aiming in stand or seated positions.

4. During target aiming, the left arm extending in lateral, anterior, and posterior directions increased the right hand oscillation significantly higher than that of the control (the left arm hanging comfortably by the side). Right hand oscillation during the left arm posterior extension was significantly greater than those on the lateral, and anterior extensions.

5. The right hand aiming at the targets that placed at 9, 12, and 1.30 o 'clock (90°, 0°, and 315°, respectively) caused hand oscillation lesser than that placed at 10.30 and 3 o'clock (45° and 270°, respectively).

6. During targeting, the lateral feet separation for 15, 30, and 45 cm. increased the hand steadiness greater than control (0 cm.); whereas aiming with the antero-posterior feet separation tended to decrease the hand steadiness.

7. Rapid and slow mental number counting had no significant effects on hand oscillation, while rapid and slow verbal number counting increased the hand oscillation greater than that of the control.

8. The longer barrel gun caused hand oscillation greater the shorter one significantly.

9. The increment in voluntary respiratory rates tended to increase hand oscillation higher than that of the normal usual rate of respiration or breath holding. The slowly voluntary breathing for 1 minute prior to targeting tended to reduced the oscillation of the hand (but not significantly).

10. Supine lying for 3 minutes preceding target aiming had no significant effect on the subsequent hand steadiness.

11. Step test (ST) for 5, 10, and 20 times before target aiming reduced the steadiness of the hand which were paralleled to the increment of the heart

and respiratory rates. At 5-minute resting after the 20 ST experiment, all parameters declined nearly to the normal levels.

12. Prolong 3-minute target aiming caused gradually higher rates of the hand oscillation and the heart rate per 10 seconds increase, while respiratory rate was not significantly altered.

These findings may be useful for some practical use in the marksmanship training.