

## A FENCING KINEMATIC ANALYSIS BASED ON COACH'S CRITERIA SUPPLEMENTARY MATERIAL

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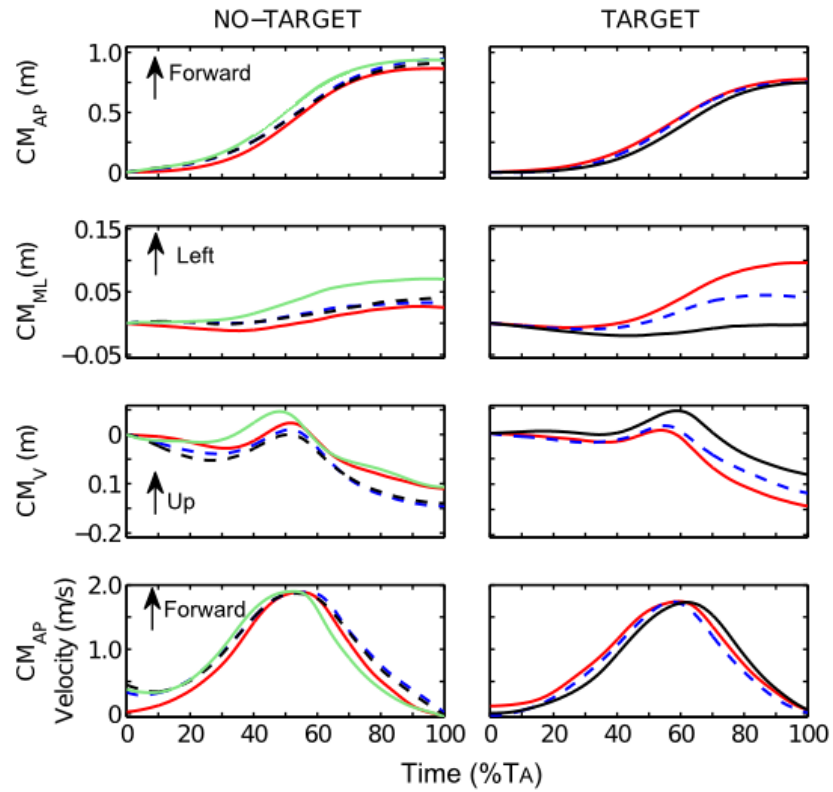
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**DATA ANALYSIS:** Trials were grouped first according to target condition and then according to performance. We calculated group mean and standard error of the mean (standard deviation to the square root of the number of trials in each group). Means for both target conditions and performance levels were compared through Z-score, as defined by the following equation:

$$Z = \frac{m_1 - m_2}{\sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}}}$$

were,  $m_i$  is the group mean,  $S_i$  is the standard deviation and  $n_i$  the number of trials in each of the two groups. We considered relevant the differences between group means for which  $Z > 2$ .

**RESULTS:** It is shown in figure S1, the three components of center of mass displacement, as well as, center of mass anterior posterior velocity. From this figure, it is possible to notice the reduced  $CM_V$  oscillation during the lunge acceleration phase and the reduced  $CM_{AP}$  range of motion in the TARGET condition compared to the NO-TARGET condition. It is also possible to see that in the TARGET condition the peak  $CM_{AP}$  velocity achieves a lower value late in the attack period. In table S1, the individual values of the analyzed variables for each trial are displayed.



**Figure S1: The three components (AP, anterior-posterior; ML, medial-lateral; V, vertical) of the center of mass (CM) displacement and its anterior posterior velocity during the attack period ( $T_A$ ). Interrupted lines indicate the best-performed trials for each target condition.**

**Table 1: Individual values for the analyzed trials in each target condition. Trial names correspond to the colors indicated in figure S1 and in figure 1. The gray columns indicate the best-performed trials in each target condition and the star (\*) indicates that data were lost due to marker occlusion.**

| Variable                                                                | Individual trial results |       |      |           |       |      |       |
|-------------------------------------------------------------------------|--------------------------|-------|------|-----------|-------|------|-------|
|                                                                         | TARGET                   |       |      | NO-TARGET |       |      |       |
|                                                                         | red                      | black | blue | red       | black | blue | green |
| IAAE (% TA)                                                             | 0                        | 13    | 10   | 20        | 19    | 24   | 18    |
| IFE (%TA)                                                               | 14                       | 16    | 22   | 16        | 14    | 8    | 7     |
| IUAE (%TA)                                                              | 42                       | 28    | 53   | 18        | 17    | 24   | 37    |
| CM <sub>AP</sub> Range (cm)                                             | 77.7                     | 75.3  | 74.8 | 86.5      | 94.6  | 90.9 | 93.8  |
| CM <sub>ML</sub> Range (cm)                                             | 10.3                     | 5.4   | 2.0  | 3.9       | 3.3   | 4.2  | 7.1   |
| CM <sub>V</sub> Range (cm)                                              | 2.3                      | 3.3   | 4.7  | 5.1       | 4.9   | 5.3  | 6.2   |
| CM <sub>AP</sub> velocity (m/s)                                         | 1.74                     | 1.74  | 1.73 | 1.89      | 1.89  | 1.87 | 1.90  |
| Instant of Peak CM <sub>AP</sub> Velocity Occurrence (%T <sub>A</sub> ) | 59                       | 58    | 62   | 55        | 57    | 53   | 53    |
| Attack Period (s)                                                       | 0.94                     | 1.03  | 0.98 | 1.08      | 0.98  | 0.97 | 1.10  |
| Armed Arm Shoulder Flex.-Ext. Range (°)                                 | 81                       | 79    | 74   | 81        | 72    | 71   | 78    |
| Armed Arm Shoulder Abd.-Add. Range (°)                                  | 17                       | 20    | 14   | 16        | 16    | 8    | 17    |
| Armed Arm Elbow Flex.-Ext. Range (°)                                    | 71                       | 65    | 69   | 82        | 69    | 61   | 78    |
| Armed Arm Elbow Pron.-Sup. Range (°)                                    | 62                       | 50    | 47   | 104       | 75    | 69   | 78    |
| Armed Arm Wrist Flex.-Ext. Range (°)                                    | *                        | 23    | 21   | 28        | 14    | 22   | 22    |
| Armed Arm Wrist Uln.-Rad. Dev. Range (°)                                | *                        | 29    | 21   | 28        | 22    | 22   | 28    |
| Unarmed Arm H <sub>S-W</sub> (cm)                                       | -22                      | -3    | -14  | -2        | 0     | -2   | -14   |
| Unarmed Arm Max. Extension Vel. (°/s)                                   | 367                      | 606   | 580  | 287       | 652   | 665  | 386   |
| Unarmed Arm Elbow Flex.-Ext. Range (°)                                  | 94                       | 123   | 106  | 93        | 142   | 156  | 90    |
| Unarmed Arm Shoulder Flex.-Ext. Range (°)                               | 88                       | 94    | 74   | 92        | 84    | 71   | 82    |
| Unarmed Arm Shoulder Abd.-Add. Range (°)                                | 58                       | 60    | 50   | 64        | 55    | 63   | 74    |
| Max. epee tip velocity (m/s)                                            | 5.5                      | 5.6   | 4.5  | 5.0       | 2.6   | 2.1  | 3.0   |

Legend: Flex.-Ext. = Flexion-Extension; Abd-Add = Abduction- Adduction; Pron.-Sup = Pronation-Supination; Uln.-Rad. Dev. = Radial-Ulnar Deviation; H<sub>S-W</sub> = relative position between UA wrist and shoulder at the beginning of attack (negative values mean wrist bellow shoulder); CM = center of mass (anterior-posterior, AP; medial-lateral, ML; vertical, V); IAEE, IUAE and IFE = respectively, the instant of armed arm, unarmed arm and foot elevation start.