

DIFFERENCES AT THE IMPULSE PHASE FOR THE FRONT SOMERSAULT ON FLOOR EXERCISE AND ON DIFFERENT TRAMPOLINES

M. M. V. Brochado, F. A. Brochado
State University of São Paulo, Rio Claro, São Paulo, Brazil

KEY WORDS: front somersault, artistic gymnastics, trampoline.

INTRODUCTION: The front somersault (FS) on the floor and on the trampoline has been described by several authors, but there are no studies that compare their execution on different apparatuses. Considering that, once airborne, the actions on the trampoline are identical to those for a FS on the floor except that the gymnast has more time at his disposal to perform these actions (Hay, 1978). The present study was designed to analyse only the impulse phase of the FS executed on the floor, trampoline, mini-trampoline and double mini-trampoline. On the floor, the double mini-trampoline and mini-trampoline, the somersault is preceded by a small run and a jump to prepare the impulse on both feet. On the trampoline there is no run and the gymnast needs to take off and land on the same spot. The purpose of this study was to verify possible differences in body positioning during the impulse phase of the front somersault on different apparatuses.

METHODS: Eight members of a trampoline team, 14 to 24 years old, where videotaped, performing at least two trials of FS on each of the following situations: gymnastics floor, trampoline, mini-trampoline, double mini-trampoline as mount and as dismount. The performances were then evaluated by an international trampoline judge and the best performer was chosen to be studied at that first moment. The impulse phase was analysed, from the moment of the first contact of both feet on the impulse surface (T1), until the moment the feet left it (T2). The appropriate images were captured and the co-ordinates of four body points (ankle, knee, hips and shoulder) were manually digitised to determine: the duration of the impulse phase; the angles of the knee and hip joints and the inclination in reference to the vertical, represented by a line connecting the hip and ankle points, at T1 and T2; the angular displacement of the above mentioned line from T1 to T2.

RESULTS AND DISCUSSION: The duration of the impulse phase was smaller on the floor and greater on the trampoline, as expected, due to the flexibility of the impulse surface. The greatest inclination angles at T1 were observed on the mini-trampoline and double mini mount, where the impulse surfaces are already inclined, so that the gymnast has to pass above an obstacle during the flight.

Table 1. Angles in degrees for knee, hip and inclination (INCL) at T1 and T2, duration (TIME) of impulse phase in seconds and angular displacement (AD)

| APPARATUS | T 1 | | | T 2 | | | T 1 | T 2 |
|----------------------|------|-----|------|------|-----|------|-------|-----|
| | KNEE | HIP | INCL | KNEE | HIP | INCL | TIME | AD |
| Floor | 142 | 128 | -29 | 178 | 160 | 0 | 0.117 | 29 |
| Trampoline | 97 | 105 | -3 | 180 | 147 | +4 | 0.283 | 7 |
| Mini-trampoline | 143 | 108 | -49 | 180 | 150 | +11 | 0.183 | 60 |
| Double mini mount | 133 | 88 | -60 | 176 | 150 | +2 | 0.233 | 62 |
| Double mini dismount | 157 | 130 | -8 | 175 | 123 | +1 | 0.217 | 21 |

CONCLUSION: The present study shows considerable differences at the impulse phase for the front somersault on different apparatuses. Considering that most of the trampoline jumpers practise and compete on the different apparatuses, it seems that the adaptations needed are fairly simple, at least for those who already master the execution of the FS. Artistic gymnastics coaches do also frequently use the trampolines to facilitate the learning of the front somersault. The implications of the differences described here should be better studied in order to determine the best usage of different apparatuses while learning the front somersault.

REFERENCES:

Hay, J. (1978). The biomechanics of sports techniques. Prentice-Hall, Englewood Cliffs