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Impact of the collision and push angles on the phases hop, step and jump in the triple jump and their relationship to the stage of take-off

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The purposes of this study were to reveal correlation between the angles of body within the motor achievement and stages takeoff (time of phase & push angle) in each phase (hop, step and jump) for elite Algerian in hop-step-and-jump. Our study supported the kinematic analyzes of the phases hop-step-and-jump within the collision and push stages, through the kinovea programmer. From this topic we want to discuss that, we've chosen the analysis of correlation (the Pearson correlation "R") in each of the phases (hop, step and jump) within the collision and push stages of time. Based on the work of practices and deficiency of elites in practice; we confirm that there's a statistically significant correlation within the collision stage (hop phase; the angle of trunk°) with the time and angle of push. The trouble of our elites is within the hop phase, and its relationship with the step and jump phases and; horizontal vertical velocity in hop phase and preservation in next phases (step and jump) as clarification is achieved and improved.

The triple jump is one of three jumping events in track and field. The literature review by Abeer Eissa (2014) confirmed that the hop-step-and-jump consists of a running approach, 3 take-off phases during which the athlete hops on one foot, lands on an equivalent foot, steps onto the other foot, and eventually jumps and lands within the sand pit. Bing Yu and James G. Hay and John A. Miller, Jr. 1985 explain the problem within the involvement of the three consecutive touchdowns and takeoffs at high speed and a change within the support leg; from that the hop-step-and-jump is technically more demanding than other jumps. Form this they achieve that the take-off of the step should be obtained, which Gordon Robertson (2004) confirms that any less change in the step phase changes the angular momentum created by hop phase. Based on the approval of Hui Liu (2012) that the phase ratio could even be a measure of effort distribution within the hop-step-and-jump (hop-dominant, balanced, and jump-dominant techniques), where the three techniques are defined based on phase ratio which Bing Yu (1982) set that nearly no one came to the 39%:30%:31% ratio in the practice of the Russian technique.

Our goal came to introduce the biomechanics evaluation before explaining the rationale scientific of the importance of maintaining the model take-off angel's push phases applied within the result.

In addition, our research analyzes the performance of world elites as modality for instance the importance of the great impact of the connection of take-offs angels pushes phases with the final results in triple jump. Our motive is to spotlight the biomechanical assessment for our Algerian coaches to plan the selection of the proper assessment technique to their athletes. We believe the interpretation of Boo Schexnayder (2014) executing that the step phase may be a physical challenge. Tremendous vertical forces must be generated within the fraction of a second; the foot is in touch with the bottom . This difficult task demands training. Our study is predicated on the rapports take-offs angels as measure of Stride length Jump distance of world elite 2009 by the German athletics federation project and the Korean Society of Sport Biomechanics from world elite 2011. To verify the hypothesis that supports:

The reasons of the weakness within the Russian technique (which emphasizes the hop phase) are the optimization going forward and up and therefore the less change within the step phase that changes the angular momentum created by hop phase.

The hop-step-and-jump is one among two track and field events during which the athlete aims to maximise the horizontal distance jumped. This jump is compose of three take-off phases (hop, step, and jump), each playing a crucial role, as they require the jumper to tolerate extremely high forces of impact and to take care of a high level of horizontal velocity. The purpose of the study was to research the biomechanical characteristics of the three take-off phases within the hop-step-and-jump during a top female athlete. The 3 take-off phases of the highest national female triple jumper were videotaped and analyzed using 2D motion analysis. Three cameras (DSR-SR 68) were placed on the lateral sides of the three take-off points, to record the motions of the three take-off phases. Results indicated that maximum loss of the horizontal velocity was within the hop phase (1.13 m/s), while the utmost braking time was within the jump phase (0.05 sec). The maximum pushing time was within the jump phase (0.10 s), while the pushing time was equal within the hop and step phases (0.05 s). In conclusion, the success of the hop-step-and-jump is that the results of the physical and technical qualities of the jumper. The excessive loss in horizontal velocity during the three take-off phases is that the main factor limiting the performance of the highest female athlete.

The triple jump is one of the track and field events, which requires the jumper to repeat the generation of maximal force in order to maintain the horizontal velocity during all phases of the jump.

The hop-step-and-jump consists of a running approach, 3 take-off phases during which the athlete hops on one foot, lands on an equivalent foot, steps onto the other foot, and finally jumps and lands in the sand pit (Miladinov and Bonov, 1988).

Triple jump distance depends on the jumper's ability to apply the basic architectural paths during each of the 3 take-off phases. During each take-off phase a change in the movement structure and rhythm occurs, which affects the timing of each concentric and eccentric contractio. Therefore, each take-off phase has its own dynamic requirements during the braking and propulsive phases. Accordingly, force distribution (magnitude, direction) and time of effect during each take-off phase both play an important role in the triple jump. Contact between the foot and the ground leads to a decrease of the vertical and horizontal velocity of the jumper.