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TURKISH GET-UP WITH KETTLEBELL FOR BALLET DANCERS: EFFECTS ON JOINT MOBILITY

IL TURKISH GET-UP CON IL KETTLEBELL PER I BALLERINI DI DANZA CLASSICA: EFFETTI SULLA MOBILITÀ ARTICOLARE

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Abstract

The purpose of this study was to evaluate the effects of a 3-month kettlebell training through the Turkish get-up (TGU) exercise, on a group of 20 dancers of a ballet school. All dancers underwent the FMS test to assess mobility and balance, prior to beginning the training protocol. The participants (aged 13-18 years) were divided into two groups: group A employed the kettlebell training, while group B (control group) continued with traditional dance training. After the kettlebell training period, through the TGU exercise, group A showed significant improvements in FMS control tests. These results suggest that specific kettlebell training, compared to traditional dance training, is effective in improving static and dynamic balance, as well as overall joint mobility in dancers.

Lo scopo di questo studio è stato valutare gli effetti di 3 mesi di allenamento con i kettlebell attraverso l'esercizio Turkish get-up (TGU), su un gruppo di 20 ballerini di una scuola. Tutti i ballerini sono stati sottoposti al test FMS per la valutazione della mobilità e dell'equilibrio, prima di iniziare il protocollo di allenamento. I partecipanti (di età compresa tra 13 e 18 anni) sono stati divisi in due gruppi: il gruppo A ha utilizzato il kettlebell, mentre il gruppo B (di controllo) ha continuato con l'allenamento di danza tradizionale. Dopo il periodo di allenamento con i kettlebell, attraverso l'esercizio TGU, il gruppo A ha mostrato miglioramenti significativi nei test di controllo FMS. Questi risultati suggeriscono che l'allenamento specifico con i kettlebell, rispetto al classico allenamento di danza, è efficace nel migliorare nei ballerini l'equilibrio statico e dinamico, nonché la mobilità articolare generale.

Keywords

Kettlebell, Turkish get-up, Basic Motor Patterns, FMS Test, Ballet.

Kettlebell, Turkish get-up, Schemi Motori di Base, Test FMS, Danza Classica.

Introduction

The Turkish get-up movement plays an important role in movement science, both as a training tool for developing strength and as an exercise for movement re-education, due to the kinetic chains involved (Ayash & Jones, 2012).In fact, it is a multi-joint and polyaxial movement, engaging the entire upper and lower body parts. During the Turkish get-up action, (henceforth abbreviated as TGU), the lateral kinetic chain and the contralateral kinetic chain work together for the strength and stability of the movement (St-Onge, et al., 2019). Consequently, while performing it, many parts of the body will need to be brought to stability, while simultaneously keeping the overload, the so-called kettlebell, in balance. For this reason, in addition to the muscle groups directly activated, it will be necessary to activate the coordination, mobility and strength of all the deep abdominal muscles during the entire TGU execution phase, especially because the execution is carried out with a kettlebell (or girya), which is a training tool consisting of a spherical body with an arched handle. The kettlebell (or gyria) is a training tool consisting of a sphere-shaped weight with a handle. Since ancient times, like in ancient Greece, athletes used tools similar to the kettlebell to prepare for the Olympics (Tsatsouline, 2002). The shape of the kettlebell was designed for a different use than today; in 1797, by order of the Tsar of Russia, the gyria was used as a counterweight to scales, and weighed a pood. However, the tool was soon used by merchants to challenge each other, through slow lifting strength tests; this changed its purpose and became a popular cultural symbol. Subsequently, the first competitions began under the patronage of Tsar Alexander III, and even after the revolution, the popularity of the giri had no end; the USSR, a world power, recognized its effectiveness and made it become a valuable training tool for soldiers (Randolph, 2011). To date, kettlebells are used in many sports sectors for functional training; in fact, by using them, it is possible to train both conditional and coordination skills, such as power, speed, flexibility, balance, and muscular and cardiovascular endurance (Jay, et al., 2011). It follows that their use makes training functional to athletic improvement, since it is also ideal for the developing mobility and stability of body movements. Therefore, by training with kettlebells, we simultaneously improve the movement of our whole body; in fact, with this tool, we can train globally and not analytically, since continuous muscle tension is required at all levels of movement (Cotter, 2021). For this reason, by activating almost all the muscles of the body, the functional activity is never localized, involving both secondary muscles and major muscles by implementing the basic principles of functional training based on multi-joint and polyaxial movements, exploiting the co-activation and co-contraction through, within and between muscles (Jay, et al., 2013). The purpose of this work was to evaluate the effects after 3 months of kettlebell training, through this exercise (TGU), on a group of 20 dancers from a ballet school. Therefore, we analyzed the TGU movement (Leatherwood, et al., 2014) and the whole well-defined sequence, thus determining another advantage of its use, namely that of being a strength builder, the goal of which is to lift heavy loads from supine to standing position. In our experimentation, the use of the TGU was aimed at training and improving basic primary movements, but especially joint mobility. In this regard, not only we achieved the outcome of having used an exercise that did not belong to the world of ballet, but through our study, we highlighted the benefits of this exercise, which is useful both to promote muscle tension and the synergy of the kinetic chains involved, therefore to develop strength (Eckert & Snarr, 2016). However, it is also necessary to improve movement stability and mobility, and therefore coordination skills. In short, people learn to move using basic motor patterns in order to improve their entire body function. Learning the specific execution of a movement as precisely and effectively as possible allows transferring this skill to other motor actions that require balance, mobility, coordination, and strength (Shaw, 2019).

1. The Turkish get-up

Cook, et al., (2001), define the Turkish get-up as perfect for training primitive motor patterns, such as rolling, kneeling, standing up and stretching out. In fact, it is performed by moving a kettlebell from supine position to upright position. The execution proceeds (Table 1) through a series of technical and interconnected movements, which make it an excellent exercise for preventing spinal pathologies, since while performing all the movements, athletes learn to lock the ribcage on the pelvis, and this allows them to avoid injuries. In fact, the spinal posture is controlled through all the progressive phases while the kettlebell is always held overhead, and the body learns tension and contraction strategies useful to maintain core stiffness, while at the same time the whole muscle-skeletal system generates inter and intramuscular strength, also in support of the stabilizer muscles and of general coordination (Dmytro, et al., 2017). Thus, the Turkish get-up promotes stability, mobility and endurance of all the kinetic chains involved, increasing strength through the motor skills of co-activation and co-contraction of the various muscle groups, by actively avoiding drop off or loss of strength throughout the exercise; this, in particular, is due to the activation of the stabilizer muscles. Being an exercise that must be performed slowly, through ascent and then descent phases, it involves extremely precise and technical positions (an example is a TGU performed on the right side with phases and steps performed on the opposite side). These are: lying supine on the floor and grabbing the handle of the kettlebell; rolling onto one's back with bent legs; extending one's arms; stretching out one's arm and leg opposite to the holding side of the kettlebell; rolling on the elbow opposite to the arm holding the kettlebell; propping oneself up onto the elbow; moving into a kneeling position so that the knee is in line with one's hand and foot; using the “windshield wiper” technique to lunge up to full standing position. Therefore this exercise can always be performed at the beginning of each training, using light or even no loads, especially to the benefit of inter and intramuscular coordination. An important detail is the choice of the load or the size of the kettlebell to be used. The heavier this will be, the more strength work will be carried out and the longer the recovery time to be observed between repetitions, precisely because the neuromuscular involvement is almost equal to a 100% commitment (Kostiantyn, et al., 2016). The Turkish get-up is a complete exercise, useful for training both conditional skills and coordination skills. It is a good exercise to be used in today's training methodology. In fact, with the advent of functional training, more and more training methods use tools that promote neuromuscular development and maintenance, with exercises aimed at achieving the multi-joint and polyaxial target of the human body (Falatic, et al., 2015). This target is useful to ensure the training of kinetic chains and the specificity of movements, which characterizes each sport. Nonetheless, certain exercises form the basis of movement science training and general training methodology. Nevertheless, some exercises are the basis of movement science education and general training methodology. In fact, the use of the TGU as a way to build strength, maintenance and prevention is significant, both at a competitive and amateur level. This is precisely because it supports a physical well-being concept aimed at building motor learning processes through educational plans for growth, and indirectly targeted at enhancing first the person and then the athlete, thus also improving his/her psychosocial sphere (Mcgill & Marshall, 2012). Therefore, with the TGU, it is possible to achieve the objectives of strength, power, mobility, muscular elasticity and prevention, thus ensuring a simultaneous nerve connection from the lower to the upper part of the body through tension and stability (Garhammer & Gregor, 1992).

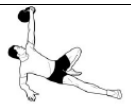
Position	TURKISH GET-UP (TGU)	
1	Contract your abdomen and glutes. By keeping your shoulders away from your ears at all times, grab the kettlebell handle and start to press the kettlebell up until full elbow extension; keep your eyes on the kettlebell at all times.	
2	Plant your heel on the ground and roll onto your elbow in the opposite direction of the kettlebell, by extending your hip.	
3	Stand up tall by pivoting on your elbow and press up onto the palm of your hand in line with your shoulder.	
5	Bring your knee to your hand by bending your free limb. Bring your knee as close as possible to the hand on the ground, trying to place the latter in straight line with your knee and foot, and keeping your eyes on the Kettlebell.	
6	Drive up into a low lunge position by pivoting your left leg around like a windshield wiper, so that it is aligned with your front leg. Bend the hip supporting your leg, bringing your glutes towards your heel so that the load moves from your hand to your knee.	
7	Place your lower limb so that your knee is at 90°. Push upwards in a standing position where your arm holding the kettlebell, your trunk and thigh are aligned, and your body is in full tension. From this position, start a reverse lunge to go back down, bringing your hand to the floor with a windshield wiper-like movement, placing your leg with the Kettlebell upwards; subsequently, your glutes, elbow and shoulder will go down to the floor until reaching position 3, then moving to position 2 and finally rolling to position 1.	

Table 1 (TGU Positions)

2. Methods

Experimental Approach

To study the effect of the TGU training in a homogeneous group of dancers (males and females), through a randomized study and with two experimental groups, the following criterion was adopted: a group A (which employed the TGUs) and a control group B (which did not employ it). All participants performed identical dance training, but group A replaced the main part of the lesson with a TGU session, while group B performed traditional dance training.

Participants

The participants sample, tested before and after 3 months of training, consisted of 20 male and female dancers (15 ± 3,5 years old; 160,25 ± 5,12 cm; 52,34 ± 3,61 kg), all attending a local dance school. All participants had at least 3 years of dance training and trained three times per week for a total of 9 hours per week. Participants were randomly assigned to one of the two groups: group A (TGUs, n = 10) and control group B (n = 10). During the study, participants did not engage in any physical activity other than dance. Prior to participation, all dancers provided informed parental consent.

Experimental Sessions

The specific training of the dancers was the same for both groups. The main exercises were the following: activation, barre and center exercises. The activation phase (10 min) consisted of both joint mobility exercises for shoulders and hips, and stretching exercises for lower limbs muscles. Subsequently, only group B dancers performed the specific training at the barre (20 min). Each exercise was performed always by starting with the right leg from the fifth position, and keeping the left hand on the barre; then the same exercise was performed with the other leg while keeping the right hand on the barre, with no rest in between. The work session at the barre ended with exercises with the leg resting on it, so as to work on muscle extension and hip mobility. Differently, group A replaced the barre training with the TGUs for 5 minutes per side, always starting with the right leg, for a total of 5 TGUs per side. Subsequently, the two groups continued to perform the traditional center exercises. Therefore, Group A did not perform "the barre exercises", replacing the traditional warm-up with the TGUs, and moving from that to the center exercises.

Measures

The assessments, conducted through the FMS Test (Gulgin & Hoogenboom, 2014), were performed at the beginning and after 3 months of training. These initial tests (Figure 1) involved screening mobility and stability, assessing the functionality and efficiency of a simple motor gesture:

1. DEEP SQUAT

   Mobility: shoulders, back, hips, knees, ankles,
   Stability: shoulders and back
2. HURDLE STEP

   Mobility: hips, knees, ankles
   Stability: hips, core
3. IN-LINE LUNGE

   Mobility and stability: trunk, shoulder, hip, ankle
   Flexibility: quadriceps
   Stability: knee
4. SHOULDER MOBILITY

   Mobility: shoulders, shoulder blades, thoracic spine

5. ACTIVE STRAIGHT-LEG RAISE

   Flexibility: hamstrings
   Stability: core
6. TRUNK STABILITY PUSH-UP

   Stability: core
7. ROTARY STABILITY

   Multiplanar core stability

Afterwards, a score was assigned to each performance:

- Score 0: for achieving the performance with pain during any movement under examination;
- Score 1: for achieving the performance by being unable to make movements without compensatory models;
- Score 2: for achieving the performance by being able to make movements, but having to use simple mechanical or compensatory models to make them;
- Score 3: for achieving the performance by making movements without any compensation, according to the established criteria.

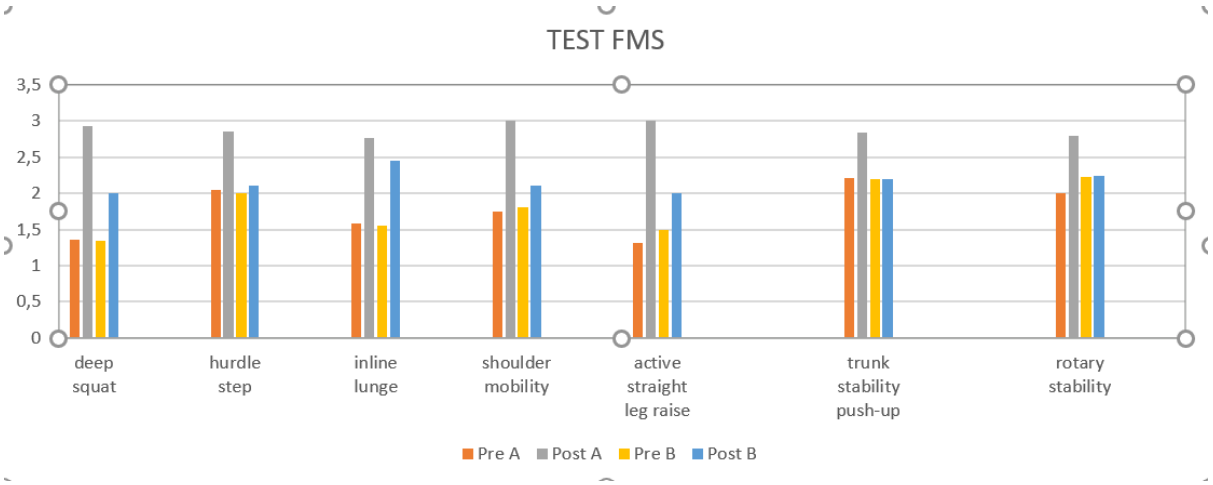
Participants performed three tests for each FMS exercise, and thus, we employed the average of three consecutive measurements.



Figure 1 (FMS Test)

3. Results

Results are presented as average ± standard deviation (Graph 1). Group A showed significant improvements in the FMS Test, whereas group B did not. Inter-group comparison revealed that the changes for group A were significantly higher than for group B (Table 2). Group A improved significantly in all types of mobility and stability screening.



Graph. 1 (FMS Test, average)

	deep squat	hurdle step	inline lunge	shoulder mobility	active straight leg raise	trunk stability push-up	rotary stability
Pre A	1,36	2,05	1,58	1,74	1,32	2,21	2
Post A	2,92	2,85	2,76	3	3	2,84	2,8
MEDIA	2,14	2,45	2,17	2,37	2,16	2,525	2,4
DEV/ST	0,636867	0,326599	0,481733	0,514393	0,685857	0,257196	0,326598632
Pre B	1,34	2	1,55	1,8	1,5	2,2	2,22
Post B	2	2,1	2,45	2,1	2	2,2	2,24
MEDIA	1,732811	1,962766	1,831955	1,920732	1,777643	2,038699	1,997766439
DEV/ST	0,271066	0,057946	0,375866	0,123249	0,20454	0,076038	0,109780009

Table 2 (FMS Test, average ± standard deviation)

4. Conclusions

To the best of our knowledge, this is the first study addressing the effects of the training protocol through the TGU in ballet dancers. The main result was the improvement, after the TGU training, in joint mobility. Therefore, a first evidence provided by this study is that 3 months of TGU training can improve ballet skills compared to traditional training. The mechanical analysis of the TGU may explain the benefits of joint mobility. In addition, previous studies have shown similar improvements in jumping performance and strength after 6 and 8 weeks of KT compared to baseline values, and this improvement was similar to that obtained in a combination of weightlifting and traditional training (Otto et al., 2012). Although this study did not evaluate the incidence on injuries, some studies show a reduced risk of injury in dancers (Welsh et al., 1998). Additionally, Cornelissen et al, (2010) showed a decrease in basal heart rate and blood pressure after endurance training with kettlebells. It should be highlighted that one of the overall goals of dance is the development of coordination, spatial perception, and dynamic joint mobility. Therefore, it is important to emphasize that our study, despite replacing a part of the ballet class (in Group A) with kettlebell lifting training not only had no negative effects, but improved joint and general/specific mobility. Dancers improved balance in the performance of center exercises, and strengthened muscles, especially those of the trunk with stabilizer muscles.

References

Ayash, A., & Jones, M. T. (2012). *Kettlebell Turkish get-up: Training tool for injury prevention and performance enhancement*. International Journal of Athletic Therapy and Training, 17(4), 8-13;

Cook, G., Burton, L., Kiesel, K., Rose, G.; Bryant, M. F. (2011). *Movement: Functional Movement Systems: Screening, Assessment, Corrective Strategies.* Foreword J. Torine. Strength and Conditioning Coach. Indianapolis Colts;

Cornelissen, V. A., Verheyden, B., Aubert, A. E., Fagard, R. H. (2010*). Effects of aerobic training intensity on resting, exercise and post-exercise blood pressure, heart rate and heart-rate variability*. J Hum Hypertens; 24: 175-82;

Cotter, S. (2021). *Kettlebell training*. Human kinetics;

Dmytro, K., Kostiantyn, P., Valentin, B., Iurii, I., Rostislav, R., Vasyl, P., & Oleksandr, K. (2017). *Development of the physical qualities of future specialists in protective activities due to the use of the kettlebell sport during studies*. Journal of Physical Education and Sport, 17(2), 789;

Eckert, R. M., & Snarr, R. L. (2016). *Kettlebell training: a brief review*. J Sport Hum Perform, 4(3), 1-10;

Falatic, J. A., Plato, P. A., Holder, C., Finch, D., Han. K., Cisar, C. J. (2015*). Effects of Kettlebell Training on Aerobic Capacity*. J Strength Cond Res; 29: 1943–1947;

Garhammer, J., & Gregor, R. (1992). *Propulsion Forces as a Function of Intensity for Weightlifting and Vertical Jumping*. J Strength Cond Res; 6: 129–134;

Gulgin, H., & Hoogenboom, B. (2014). *The functional movement screening (FMS)™: An inter-rater reliability study between raters of varied experience*. International journal of sports physical therapy, 9(1), 14;

Jay, K., Frisch, D., Hansen, K., Zebis, M. K., Andersen, C. H., Mortensen, O. S., & Andersen, L. L. (2011). *Kettlebell training for musculoskeletal and cardiovascular health*: *a randomized controlled trial*. Scandinavian journal of work, environment & health, 196-203;

Jay, K., Jakobsen, M. D., Sundstrup, E., Skotte, J. H., Jørgensen, M. B., Andersen, C. H., ... & Andersen, L. L. (2013). *Effects of kettlebell training on postural coordination and jump performance: a randomized controlled trial*. The Journal of Strength & Conditioning Research, 27(5), 1202-1209;

Kostiantyn, P., Volodymyr, A., Volodymyr, M., Vasyl, P., Igor, R., Valentin, B., & Sergiy, B. (2016*). Improvement of physical preparedness of sportsmen in kettlebell sport on the stage of the specialized base preparation*. Journal of Physical Education and Sport, 16(2), 540;

Leatherwood, M. D., Whittaker, A., & Esco, M. R. (2014). *Exercise technique: The Turkish get-up with a kettlebell*. Strength & Conditioning Journal, 36(6), 107-110;

Mcgill, S. M., & Marshall, L. W. (2012*). Kettlebell swing, snatch, and bottoms-up carry: Back and hip muscle activation, motion, and low back loads*. J Strength Cond Res; 26: 16–27;

Otto, W. H., Coburn, J.W., Brown, L. E., Spiering, B. A. (2012). *Effects of Weightlifting vs. Kettlebell Training on Vertical Jump, Strength, and Body Composition*. J Strength Cond Res; 26: 1199–1202;

Randolph, D. (2011). *The Ultimate Kettlebell Workbook: The Revolutionary Program to Tone, Sculpt and Strengthen Your Whole Body*. Ulysses Press;

Shaw, T. (2019). *Clinical application of the Turkish Get-Up to an acute shoulder injury in a competitive Brazilian Jiu-Jitsu athlete*. Journal of Bodywork and Movement Therapies, 23(3), 628-633;

St-Onge, E., Robb, A., Beach, T. A., & Howarth, S. J. (2019). *A descriptive analysis of shoulder muscle activities during individual stages of the Turkish Get-Up exercise*. Journal of Bodywork and Movement Therapies, 23(1), 23-31;

Tsatsouline, P. (2002). *From Russia with Tough Love: Pavel's Kettlebell Workout for a Femme Fatale*. Dragon Door Publications, Inc;

Welsh, T.M., Jones, G. P., Lucker, K.D., Weaver, B. C. (1988). *Back Strengthening for Dancers A Within-Subject Experimental Analysis*. J Dance Med Sci, 1988; 2: 141–148.