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PREVENTION & REHABILITATION: Case Report

Clinical application of the Turkish Get-Up to an acute shoulder injury in a competitive Brazilian Jiu-Jitsu athlete

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ABSTRACT

Introduction: The rationale for this case report was to identify the strengths and weaknesses associated with prescribing the Turkish Get-Up as an isometric shoulder and neck exercise. The Turkish getup is an effective tool for isometrically loading the cervical spine and shoulder and can be used with minimal space and equipment.

Discussion: The Turkish Get-Up was selectively applied as a therapeutic corrective intervention to a patient suffering a mild to moderate cervical, acromio-clavicular and sterno-clavicular joint sprain with associated facet syndrome and muscle spasm. There were concerns that initially gave a guarded prognosis with the realization that further imaging may be warranted after an initial trial.

Conclusion: The Turkish getup is an effective tool for isometrically loading the cervical spine and shoulder and can be used with minimal space and equipment. This exercise allowed the injured patient to integrate full body movement and conditioning with an emphasis on pain free isometric shoulder and cervical spine contractions to re-establish strength and motor control. The patient now has the ability to add to his training and rehabilitation an exercise that can be endlessly progressed to build continuous strength, endurance and motor control.

1. Introduction

The goal of this paper is to show how the Turkish Get-Up was effectively used to rehabilitate a young athlete after a shoulder injury sustained during a fall in Brazilian Jiu-Jitsu training. The athlete showed reservations about a program consisting of passive care and was eager to get his shoulder strong and healthy again as quickly as possible (see Figs. 1–7).

We will review the initial imaging and exam findings along with the working diagnosis and therapeutic interventions that made this case unique.

2. Presenting concerns

The patient presented to the clinic as a 35-year-old, otherwise healthy male. He stated he had a history of a neck injury stemming from his college football days nearly 20 years earlier. He had X-rays, but no MRI scan, and the findings were unremarkable. He stated that he had had chiropractic care in the past and that it had successfully aided in the management of his cervical symptoms. He no longer had any numbness, tingling, radiating pain or motor loss that he had originally claimed with the previous neck injury.

His most recent injury was a fall during Brazilian Jiu-Jitsu training a week prior to his presentation to our office. As this was a traumatic impact injury, the concern regarding fracture and joint dislocation with ligament sprain in the shoulder and cervical spine was high.

3. Clinical findings

The patient described no relevant medical family or social history other than the previous neck injury.

4. Exam

X-ray examination of the cervical spine and right shoulder included AP and lateral cervical views along with clavicular and shoulder internal and external rotation views. No fractures or dislocations were present. Weighted views will be considered with undesirable outcomes.

Upon physical examination, there were no notable neurological

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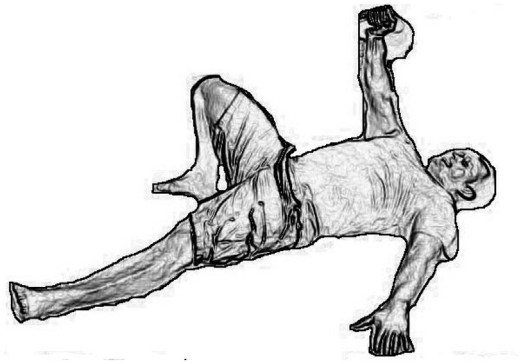

Fig. 1. The starting position. This position begins with the same side arm and leg up and the opposite are stretched out to 45°.

Fig. 2. Rotation is initiated by the flexed leg to achieve the seated braced position. This a stopping point to evaluate both shoulder and core stability and motor control.

findings. A positive orthopedic evaluation consisted of cervical compression; cervical extension compression; right sided positive Spurling's test; positive distraction, and positive shoulder depression tests were noted bilaterally. The patient had painful active ROM in every direction of the cervical spine and right shoulder; however, he was able to maintain a nearly pain-free neutral neck position. Passive ROM was painful but to a much lesser extent, and decreased significantly once a position was maintained. Palpation showed muscle spasm with pain at the posterior cervical spine, bilateral sternocleidomastoids, bilateral trapezius, along with the right scalene and deltoid muscles. There was pain with palpation of the right acromio-clavicular joint and right sterno-clavicular joint. There was minor elevation and swelling of the right sterno-clavicular joint, but none noted at the acromio-clavicular joint. The patient also had a notable positive cervico-cranial flexion test (Liebenson, 2007) that showed decreased activity of the deep neck flexors. The Janda shoulder abduction test was positive for compensation of the trapezius for the deltoid (Liebenson, 2007). There was severe pain at the 45-degree mark.

Given the nature of the injury and the case presentation, an initial examination including X-rays and orthopedic tests was warranted. Further consideration for advanced imaging of MRI was to be considered pending poor outcomes. The initial prognosis was guarded due to the severity of pain and dysfunction. Currently there were no diagnostic challenges notes.

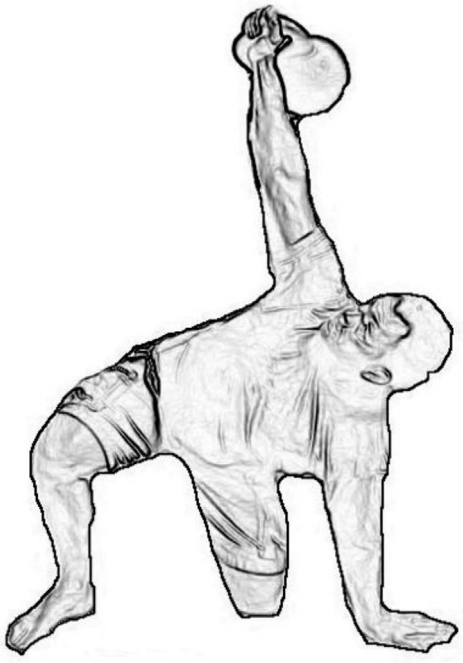

Fig. 3. The transitional position from the high bridge or low sweep as the patient moves to the kneeling position. The single leg hip hinge is the transitional motion that allows the hand to come off the ground in progression to the half kneeling position.

Fig. 4. Also known as the half kneeling position, demands for shoulder and hip stability are high.

Upon evaluation the patient was diagnosed with a grade 1 sprain of the right sterno-clavicular joint and the acromio-clavicular joint along with a mild to moderate whiplash injury with right sided facet involvement and muscle spasm due to the impact. He had notable muscle inhibition in both the shoulder abduction test and the cervico-cranial flexion tests.

Fig. 5. Final standing position.

Fig. 6. Correct neutral wrist position.

Fig. 7. Incorrect wrist extension position.

Initial outcomes were measured utilizing the Yellow Flags Questionnaire; the Neck Bourne Questionnaire; the Upper Extremity Functional Scale; the Fear Avoidance Belief Questionnaire. These outcomes concluded that the patient had some fear avoidance beliefs based around movement of the cervical spine and shoulder, but vocalized that he was eager to begin the rehabilitation process.

4.1. Treatment

Due to the nature of the athlete, his desire to stay active, and his ability to maintain a pain free isometrically contracted shoulder and neutral cervical spine, an aggressive shoulder and neck stability program was initiated utilizing the Turkish Get-Up as the exercise of choice. He was also prescribed cervical and shoulder joint manipulation, surrounding soft tissue mobilization consisting of IASTM (instrument assisted soft tissue mobilization) and biomechanical taping to the neck and shoulder.

Chosen for its uniqueness as a full body exercise, the Turkish Get-Up allowed a stabilizing emphasis on the injured shoulder and cervical spine, while also challenging and integrating the entire kinetic chain.

The patient was instructed to begin active care immediately (Bayer et al., 2017). Initially we began with the involved arm upwards, in an aim to place less load and more stability demands on the injured side. Our progression would involve pain free mastery of the technique with the involved side up before attempting an involved side down repetition.

We began with a weightless pattern utilizing a shoe balanced on his closed fist for biomechanical stability feedback. The idea of the shoe was to use an implement with minimal load that would create significant external feedback for maximal motor learning and proximal stabilizer recruitment (Budoff, 2004; Moore, 1975; Wulf et al., 2001). He was instructed to allow pain to be his guide for termination of the exercise.

The patient began the exercise in Position 1 with a shoe positioned on the closed fist of his extended injured arm for movement and stability feedback. He was instructed to first perform 10

cervico-cranial chin tucks to acquire and maintain the packed neck position. He was next instructed to explore internal and external rotation of the shoulder while maintaining the cervical position and shoulder stability necessary to balance the shoe on his fist. This portion of the exercise was used as a qualifying step to ensure that pain free cervical packing and shoulder stability was attainable.

The patient was then coached through positions 1–5 with pauses emphasized at each stopping position to check form and stability and make any corrections necessary. Although challenging, the patient was able to stabilize appropriately and maintain proper cervical position throughout 10 repetitions. He was instructed to practice at home and return to the clinic in two days.

4.2. Follow up and outcomes

4.2.1. Visit 2

The patient returned to the clinic reporting increased confidence in his shoulder and neck. He stated the exercise was challenging yet fulfilling.

The process was initiated again, in the same way as day 1; however, this time the patient was progressed to the 15lbs kettlebell to add further stability demands to the exercise.

The patient was able to, without cue, achieve the packed neck position and perform 2 sets of 10 repetitions with the 15lbs kettlebell while maintaining a pain free shoulder and cervical spine.

After instruction on how to monitor proper form, the patient was instructed to return to the clinic after the weekend for a final progression and examination.

4.2.2. Visit 3

After practicing for 3 days on his own the patient presented to the clinic for a 3rd progression and evaluation.

Rechecking and passing form qualification the patient was instructed to attempt the bottoms up Turkish Get-up progression with the 15lbs kettlebell.

The bottoms up progression offers increased demands for stability and motor control without the risks associated with prematurely increasing weight. The patient was able to perform 3 sets of 8 quality repetitions. He was instructed to master the bottoms up progression for 3 sets of 12–15 repetitions before increasing weight and returning to the classic Turkish Get- Up.

Outcomes were again measured utilizing the Yellow Flags Questionnaire; the Neck Bourne Questionnaire; the Upper Extremity Functional Scale; the Fear Avoidance Belief Questionnaire. These outcomes concluded that the patient was experiencing decreased pain and improved overall confidence in the strength and stability of his shoulder.

The examination revealed that the patient was able to achieve pain free cervico-cranial flexion with position maintenance for 30 seconds. He was able to perform the Janda shoulder abduction test to 60° with a 3/10 VAS pain rating.

The patient was instructed to continue passive therapy for two more weeks while integrating the Turkish Get-Up into his out of office workouts while demonstrating form checks at each subsequent office visit. The patient was to be coached on weight progression as qualified and needed.

Overall the Turkish Get-Up allowed this injured patient to integrate full body movement and conditioning with an emphasis on pain free isometric shoulder and cervical spine contractions that aided in re-establishing motor control and stability to the injured area.

4.2.3. Discussion

The strength of this case report is found in the results seen by the patient in the initial three visits. With proper use of this exercise the patient was able to make significant gains in shoulder and neck function in just three visits while improving his prognosis significantly.

The limitations however, are seen in that long-term follow-up must be undertaken to see if progress continues to be made and if so, to what degree. Re-injury also poses a challenge to long-term outcomes as with any contact or combat sport.

The key message demonstrated in this case report is that full body exercise with strategic isometric loading can be very beneficial to the recovery speed of an injured person.

The literature cited supports the idea that isometric loading is beneficial for injured tissue and is a quality starting point when there is pain in normal range of motion (Joyce and Lewindon, 2016). It also supports that training the non-injured limbs can have specific muscle sparing benefits in the injured limb (Andrushko et al., 2018; Taanila et al., 2009). Due to these circumstances the Turkish Get-Up was selected as the exercise of choice.

4.2.4. Conclusion

Overall the Turkish Get-Up allowed this injured patient to integrate an exercise requiring full body movement and conditioning with an emphasis on pain free isometric shoulder and cervical spine contractions. This aided in re-establishing motor control and stability to the injured area.

The patient is thus able to add to his training and rehabilitation an exercise that can be endlessly progressed to build continuous strength, endurance and motor control.

4.2.5. Exercise performance details

The kettlebell Turkish Get-Up is a unique exercise that requires mobility, stability, and strength throughout the entire human kinetic chain. These demands stem from the grounded ankles to the overhead weighted wrist. It is a movement that can also aid the clinician as a movement screen and an exercise.

As a screen the clinician can use the Turkish Get-Up to view asymmetrical movement from one side to the other. They can use this information to then decide if further intervention is necessary to correct the movement pattern. Areas that require more mobility can then be mobilized or stretched, and areas that require more motor control or stability can be identified as well.

The Turkish Get-Up is also unique in that it can be effectively scaled from no-load to high-load easily and effectively to build stability and strength.

The technique requires aspects of active hip extension, rolling, bilateral shoulder stability, core bracing and rotation, hip hinging, and cross crawl patterns (specifically D2 PNF patterning) (Adler et al., 2008).

A benefit to the coach and clinician is how the Turkish Get-Up encompasses the numerous stages of neurodevelopment with progressive stopping points at the lying, sitting, kneeling, and standing positions. These stopping points allow for easy progression and neural grooving of common sticking points that may present as problems for the patient.

The kettlebell Turkish Get-Up has some added benefits over the dumbbell variation. The kettlebell provides an off-centered weight distribution, unlike a dumbbell which is centered perfectly. The shifting weight of the kettlebell challenges the neutral wrist and forces a tighter grip, which in turn helps to strengthen the entire kinetic chain through “excitation overflow” (Moore, 1975) and “PNF irradiation” (Adler et al., 2008). Due to this process, added strength and stability benefit areas far outside the hand and wrist, such as the shoulder, neck, and core stabilizers.

5. Therapeutic benefits

5.1. The neck and shoulder

The shoulder and neck are a very complex pair and rely heavily on each other for common and complex movements. If we refer to the "Joint-by-Joint Approach" (Cook, 2010), we see that a loss of stability or mobility in one will cause compensation in the other very quickly. The Turkish Get-Up helps the user learn to pack the neck and disassociate it from the shoulder while training the shoulder to remain stable and braced in isometric contraction.

The packed neck is another term for the neutral neck. However, the term neutral does not account for the bracing and muscular engagement that needs to be maintained during the exercise. Packing the neck means engaging the musculature of the cervical spine so that the neck remains neutral throughout the movement. One of the greater challenges to spinal stability is to remain neutral during extremity motion (Liebenson, 2007). The packed neck helps the patient maintain stable control of the cervical spine during motion.

The shoulder itself is one of the most dynamic joints in the body as it requires a fine balance of mobility and stability throughout its vast range of motion. A slightly forgotten aspect of shoulder stability is its interaction with the grip. From the literature (Horsley et al., 2016; Budoff, 2004) we know that grip strength can directly correlate with shoulder stability. The kettlebell Turkish Get-Up requires a focused grip and for the user to maintain active wrist flexion. When coupling this concept with the literature on the irradiation principles of "Proprioceptive Neuro-Muscular Facilitation" (Adler et al., 2008). It can be hypothesized that greater grip requirements will result in greater shoulder stability.

5.2. The hips and low back

Furthermore, the joint-by-joint approach (Cook, 2010) demonstrates that the hips tend towards mobility restriction while the lumbar spine tends towards stability losses. The half-kneeling hip hinge of the Turkish Get-Up offers a solution to both problems.

The hip hinge is a spine sparing motion that requires pairing hip flexion with simultaneous lumbar bracing. The Turkish Get-Up encompasses aspects of the half-kneeling hinge in its transition from position #3 to position #4. The half kneeling hip hinge has the added benefit of teaching the practitioner to isometrically brace against aberrant spinal movement throughout an active full body range of motion. In a six-week trial by McGill, isometric core contraction was shown to offer reduced lumbar compressive forces compared to its dynamic counterparts while increasing core stiffness (Lee and McGill, 2015). Isometric core exercise has also been used successfully in injury prevention (Taanila et al., 2009).

The Turkish Get-Up assists the practitioner in building a stable low back while learning the hinge, a fundamental movement of mobile hips.

For patients or athletes who need additional support with hip mobility or lumbar stability, practice in the tall kneeling hip hinge can be of great benefit. For patients or athletes who have mastered the hinge with adequate lumbar bracing, loading this position can allow good progression in their performance or therapy respectively.

6. Technique(A right sided example)

6.1. Position 1: the setup

The patient should begin by lying flat on their back with the kettlebell off to their side. They should then grip the bell with their right hand and press it straight up, so it is in line with the shoulder and resting at arm's length overhead. They should then pack the shoulder down by squeezing the latissimus dorsii; then force the grip to neutral so the knuckles and proximal phalanges are parallel to the floor. Setting the grip is important and creates the pattern for how the shoulder and neck will be used. Any deviation in wrist position will constitute an energy leak and cause form breakdown throughout the pattern.

If gripping the bell with the right arm, bring the right knee up so the hip and knee are flexed, and the right foot is on the ground close to the right gluteal muscle. Extend the left arm out to 45°, laying the palm flat on the ground.

6.2. Position 2: braced sitting

Keeping the eyes on the kettlebell, the patient should use their right leg to drive the torso up to post on the left elbow. It is important to keep the back muscles notedly the latissimus dorsi and scapular retraction muscles engaged pulling the shoulders down so that they remain far away from the ears. The neck should remain neutral and engaged. Next, push from the left elbow to the left hand. In this position the patient is seated with the left hand braced on the ground while the right knee is still pointed up. The kettlebell is extended overhead in the right hand. This position almost looks like a supported sitting position.

6.3. Position 3: low sweep vs. high bridge

Next is the transition to a kneeling position. There are many ways to accomplish this. This article will focus on the low sweep and high bridge.

The high bridge requires the patient to drive the hips to the ceiling; the right knee is still slightly bent while the left leg remains straight. All the body weight is supported on the left arm while the right arm and hips are now fully extended.

The low sweep requires the patient to elevate just enough to clear the left knee off the ground. All the form mechanics continue to hold true.

With both the high bridge and the low sweep, the left leg is swiveled so that it is completely under the body and placed adjacent to the left hand that is still posted on the ground.

6.4. Position 4: kneeling

At this point, the patient in a kneeling left hip hinge position with the left knee and right foot on the floor. The right knee and hip are flexed, and the right hip is abducted. In this position, the patient in a single leg kneeling hip hinge.

To elevate, drive the hips forward using the gluteal muscles and hip extensors until the elevated high kneeling position is achieved. The patient's eyes should remain on the kettlebell and the grip engaged. Square the right hip to a lunge position while maintaining a vertical right tibia.

6.5. Position 5: standing

From the kneeling lunge position drive straight up to the standing position and square the feet.

Upon completing this position, the patient will be standing fully erect with the kettlebell directly overhead. Next, reverse the position back to lying to complete the motion in its entirety.

7. Common mistakes

With five main positions and stopping points there are many parts of the Turkish Get-Up that need special attention. Throughout

the movement, alignment and stability should remain a priority.

7.1. Pitfall #1: the grip

An incorrect hand and wrist position is the most common pitfall when performing the kettlebell Turkish Get-Up. With the kettlebell settled on the posterior aspect of the forearm it becomes easy for the wrist to deviate into extension. Allowing this deviation will decrease shoulder stability and begin a breakdown in form that can carry to many other areas of the Get-Up.

7.2. Pitfall #2: shoulder position

The shoulder should remain packed down with the latissimus and scapular muscles engaged throughout the motion. Allowing the shoulders to hunch up toward the ears signifies a lack of stability in either the upper kettlebell arm or lower supporting arm. Coaching the patient or athlete to drive the shoulders down and away from the ears is best practice.

Maintaining an active line of drive from the lower left wrist to the left shoulder and from the left shoulder to the right shoulder will increase stability and power.

7.3. Pitfall #3: the hip hinge

After the low sweep or high bridge, the patient or athlete ends up in a kneeling hip hinge. It can be very easy to break form here; however, a strict hip hinge to achieve the erect half-kneeling position is essential. This position is an excellent stopping point. Performing 3–5 hinge repetitions with improved mechanics can grease the neural groove, which spares the lumbar spine.

7.4. Pitfall #4: the neck

The neck should remain neutral in the packed position throughout the exercise. This is a position of strong isometric contraction that allows for mobility but maintains stability. Athletes or patients with a history of neck issues will greatly benefit from focusing on the neutral neck.

Conflicts of interest

I have no conflicts of interest to disclose. No financial obligations or motivations of any kinds are attached to this publication.

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