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Case Study

# Total assessment-reassessment & evaluation using bioKinesiologic (TAREK) approach: case presentation for theoretical formulation

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**Abstract.** [Purpose] To introduce a new systematic physical therapy evaluation aiming to facilitate the process of examining complicated musculoskeletal cases. [Subject and Methods] The patient was a 20 years old male college student who had major motor vehicle accident one year ago. The patient was poorly responding to physical therapy and he felt that his case was worsening. The complexity of the case dictated a new evaluation with a different approach to resolve the barriers hindering the patient from showing functional improvements. [Results] The new evaluation approach explained many undetermined and stubborn symptoms experienced by the patient. The expert confirmed that the traditional evaluations methods utilized were insufficient to address patient's complaints. [Conclusion] Total Assessment-Reassessment & Evaluation using bioKinesiologic (TAREK) approach is comprehensive evaluation strategy using systematic pathway that guides clinicians to pinpoint the contribution of pathoanatomical structures in producing pathomechanical mobility and poor functional outcomes.
**Key words:** Differential diagnoses, Mechanical diagnosis, Clinical reasoning

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## INTRODUCTION

Road traffic accidents (RTAs) are one of the major leading causes of morbidity in Kingdom of Saudi Arabia[1)]. Young males constitute the largest proportion of victims of RTAs[2)]. Researchers reported that RTAs resulted in almost 80% of patients with spinal injuries and account for 20% of bed occupancy[3)]. Management of patients with multiple injuries constitutes a major challenge and imposes a huge burden on health care system. Regardless of the type of injury assessment chosen by physical therapists, documentation of clinical findings must be consistent with the accepted standards[4)]. Missing clinical data would render weak, incomplete, and inconclusive picture regarding patient's condition. However, as a fact of matter, the medical diagnosis and traditional physical therapy evaluation are short of addressing the sufferance of rehabilitation patients particularly in complicated cases. Given the complexity of the cases with a history of major trauma and the widespread sufferance, the physical therapists must follow a systematic approach in order to delineate the potential sources of complaints. We hypothesize that the regular physical therapy evaluation and the generalized physical therapy exercises are inadequate to

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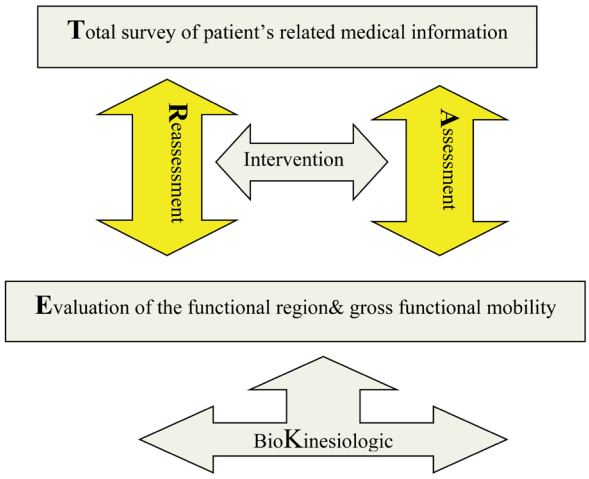


**Fig. 1.** TAREK approach for complex neuromusculoskeletal cases.

pinpoint the sources of disorder or guide therapy in complicated cases.

## SUBJECT AND METHODS

The study subject was a 20-years-old right hand dominant male college student, reported to physical therapy outpatient clinic for evaluation. Patient was evaluated by orthopedic physical therapy consultant with over 25 years of clinical experience. The evaluator is a board certified orthopedic clinical specialist by American board speciality of physical therapists[5], certified mechanical diagnosis and therapy by McKenzie institute of North America[6], and a holder of philosophy of doctorate in physical therapy. The expert used the newly created Total Assessment-Reassessment & Evaluation using bioKinesiologic (TAREK) approach to evaluate the complicated patient (Fig. 1). First, total denotes total survey of patient's related medical information. Patient stated that he had major car accident 1 year ago. Patient was not seat belted and did not lose his consciousness at the time of the accident. Patient was taken to the emergency by the ambulance where he had X-rays and was released to follow up with his medical doctor. Patient added that he stayed home for two weeks and was barely moving in his house because of his pain all over his body. Patient indicated that the pain at the lower back in addition to the shooting pain at both legs and groins are the main complaints. Pain is 4–5/10 at the time of evaluation which goes up to 8–9/10 at worst and goes down to 2/10 at best. Patient added that he feels that his case is worsening. Patient indicated that pain at the lower back is the kind of dull spasmodic pain. Pain at groins is a kind of dull deep pain, and shooting pain at both legs. Patient indicated that walking for 10 minutes, walking up and down stairs, standing, and coughing all increase back and leg pain. Lying down on back or right side decreases pain at the lower back. Patient has to take pain medications when symptoms aggravates. Patient becomes very cautious when conducting activities of daily living and stopped going to the gym since he had his car accident. Patient added that his back, groin, and leg pain is limiting his ability to walk and tend to limit his endurance ability to keep walking without feeling spasmodic pain, numbness, and weakness in both legs. Assessment-Reassessment denotes hands on examination of the areas of primary complaint. The clinician could follow the assessment with either within session intervention or consecutive session intervention as needed. Evaluation denotes estimation of the reflection of the patient's complaints on regional and general functional mobility and judging the best course of action. The main management tool is the bioKinesiologic method particularly in neuro-musculoskeletal cases. Patient has limited end range of all spinal movements especially the forward flexion and backward extension lumbar mobility. Upper and lower limbs mobility is within functional limits. Left shoulder abduction and rotations are slightly limited but of poor quality. Composite upper limbs functional movements are within functional limits. Forward bending mobility showed 20 cm from fingertip to the floor with significant increase of pain at the right side of the lower back. Prone on elbows results in back pain and left side sciatica up to the knee and midcalf. All passive accessory movements of the spine are limited but did not cause significant changes in symptoms. Manual muscle test is within functional limits. Functional muscle test showed mild to moderate difficulties when walking on heals. Observational gait analysis showed limited trunk rotation during walking. Neuromusculoskeletal screening did not show any apparent deficit except some intermittent paresthesia and numbness at left arm and from lower lumbar to the midcalf at both sides in addition to numbness at toes of both feet. No significant past, social or family history, comorbidities, or lab findings. Patient was noticed to sit slouched with forward head-neck posture. Patient has some difficulties to balance on one leg, especially with eyes closed. Straight leg raising is +ve for right side at 65° and for left side at 70°. Scouring left and right hips did show any apparent deficit. Patient has lumbar quadrant on both sides which aggravates when applying

compression on the trunk. No red or yellow flags were detected at the time of evaluation. This study was approved by the Ethics Committee of College of Medical Rehabilitation Sciences, Taibah University (Approval No. CMR-PT-2017-006). Informed consent was obtained from the patient to publish this case report.

## RESULTS

Initial medical report indicated general, inadequate and non-specific clinical findings. After using TAREK approach, the expert managed to give full description and very specific clinical findings, including but are limited to, pain site, onset, duration, severity, nature and its behaviour in addition to how does it interferes with activity of daily living and how it affects the quality of life. The expert also reported objective orthogonal and functional mobility for appendicular as well as axial skeleton. A full motor, sensory, deep tendon reflex and neural tension tests were reported. Regional and general functional mobility were reported as denoted by composite functional mobility and gait pattern. TAREK approach used clinical biokinesiology to have the principles of mechanics readily available to explore the pathomechanics of different biological structures.

## DISCUSSION

Comprehensive assessment is the first step for proper management. Assessment should be conducted in systematic way with emphasis on the most significant clinical findings. Unfortunately, there is no specific feasible evaluation strategy to be adopted by majority of physical therapists and rehabilitation professionals when examining complicated patients. The case discussed in this report had regular evaluation and was receiving modalities and general exercises 3 times/ week for a number of months without showing any significant progress. Pain medications and muscle relaxants in addition to general, non-specific physical therapy exercises were short of addressing the specific therapeutic needs of the complicated neuro-musculoskeletal cases with a history of major trauma. The expert conducted a new detailed and comprehensive evaluation using TAREK approach. The expert involved the patient from the beginning of the evaluation to the end of designing the rehabilitation program, since patients with complicated illness should be educated about their cases and having them as active partners in their rehabilitation program. Being active partners will convey the patients' opinion regarding the progress of the disorder and the value of rehabilitation on their life[7]. The expert assessed every area and joint followed by assessment of every region and functional unit. For example the expert assessed lower lumbar area and L4, L5 followed by assessment of lumbar region and lumbopelvic functional unit. Assessment was followed by reassessment within the same session after applying two sets of passive accessory intervertebral mobilization. Reassessment was conducted in the consecutive visit after having the patient doing a home exercise program of prone on elbows and straightening elbows as tolerated. Evaluation was directly conducted after the reassessment by having the patient doing functional activity like walking or lifting. Generalized exercises were replaced by case-specific therapeutic exercises[6]. The therapeutic exercises should be tailored to every complicated patient based on the chief complaints reported by the patient and confirmed by TAREK approach. Exercises emphasized on promoting stability at the midrange[8]. Midrange endurance testing and training is recommended to avoid aggravation of symptoms[8]. Stability, balance and muscle control should precede pushing the patient to gain new range of functional mobility[9]. Patient used to complain of aggravation of symptoms when doing back extension exercises from lying down on the floor. The therapeutic ball was used instead to develop endurance and balance with less stress on the diseased spine. Peanut ball should be a good start before progressing to the regular Swiss ball[10]. Patient reported feeling better when using the therapeutic ball and he experienced less post exercise soreness and pain[11]. Skilled physical therapy techniques were applied. Educating the patient about ways to control symptoms and the red flags regarding the radiculopathy was fundamental. Patient had a follow up consultation to monitor progress and modify plan of care as needed. In conclusion TAREK approach is recommended when evaluating complicated cases and using clinical biokinesiology constitutes the core of determining the mechanical culprit behind the pathomechanical and physical complaints.

### *Conflict of interest*

The authors declare that there is no conflict of interest.


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