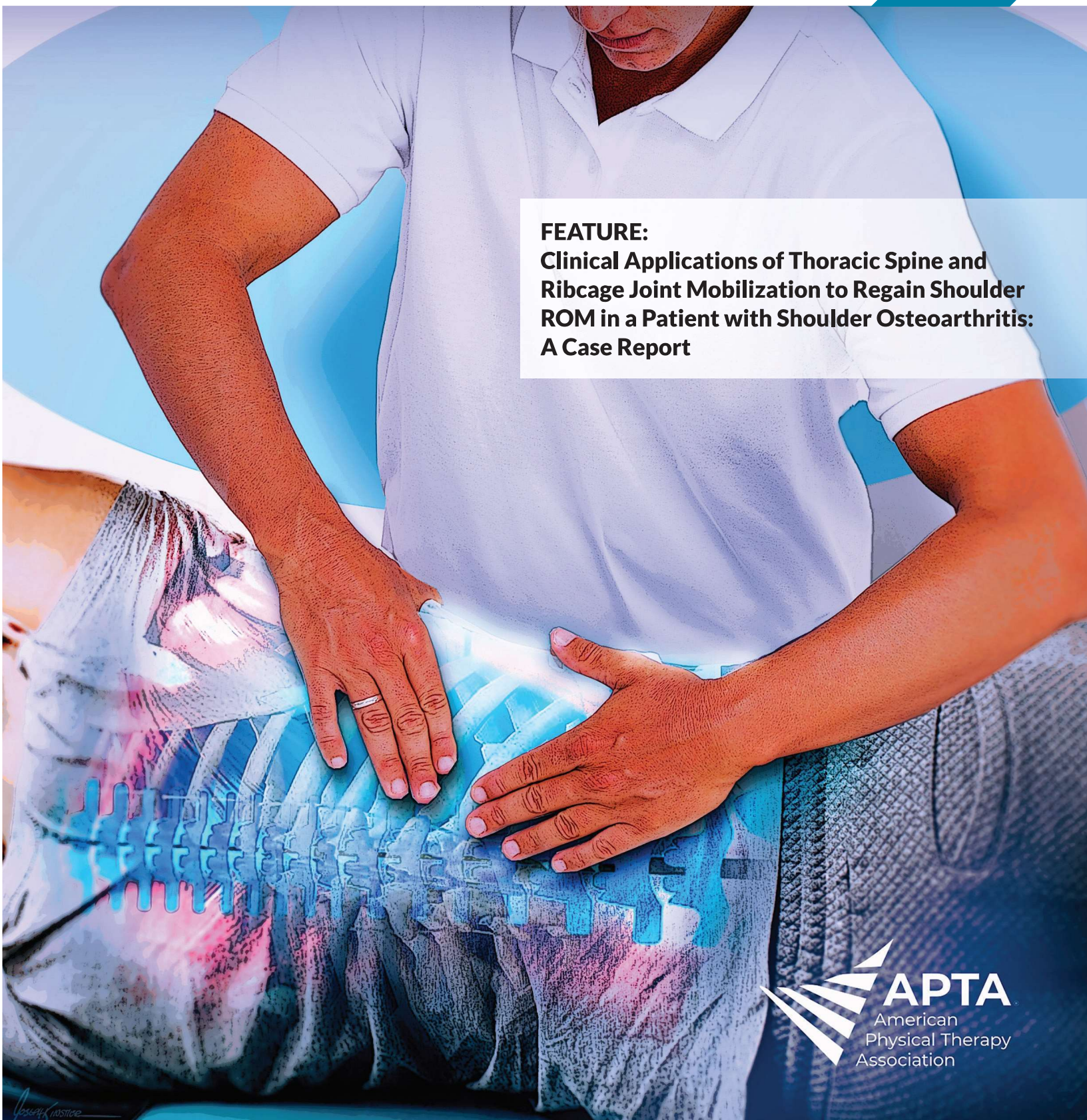
2024 / volume 36 / number 2

ORTHOPAEDIC PHYSICAL THERAPY PRACTICE

The publication of the Academy of Orthopaedic Physical Therapy, APTA



FEATURE:
Clinical Applications of Thoracic Spine and Ribcage Joint Mobilization to Regain Shoulder ROM in a Patient with Shoulder Osteoarthritis: A Case Report

APTA American Physical Therapy Association

Clinical Applications of Thoracic Spine and Ribcage Joint Mobilization to Regain Shoulder Range of Motion in a Patient with Shoulder Osteoarthritis: A Case Report

Angela Wilson Pennisi, PT, DPT, MS, OCS

President and Chief Executive Officer, PhysioPartners, PC

ABSTRACT

Background and Purpose: Impaired shoulder range of motion (ROM) is a common finding in patients with shoulder osteoarthritis. Few studies have evaluated the effects of rib mobility, chest wall shape, and rib mobilization on glenohumeral joint osteokinematics. The purpose of this case study is to describe the effects of interventions directed primarily to the ribcage and thoracic spine (TS) on shoulder complex ROM. **Methods**: This case report details the evaluation and treatment of a 66-year-old male patient with a history of bilateral shoulder pain and limited range of motion secondary to previously being diagnosed with osteoarthritis. **Clinical Findings**: The patient demonstrated significant increases in shoulder complex ROM following interventions directed to the ribcage and sustained functional shoulder ROM at discharge. **Clinical Relevance**: These interventions may be useful as an alternative in cases where glenohumeral mobilization is not tolerated or would not be appropriate. **Conclusion**: This case report demonstrates the effectiveness of interventions targeting rib and thoracic spine mobility, chest wall shape, and posture on improving shoulder complex ROM.

Key Words: generalized joint hypermobility, manual therapy, postural stability, thorax

BACKGROUND AND PURPOSE

Glenohumeral osteoarthritis is associated with reduced range of motion (ROM), activity limitations, and participation restrictions.[1] Interventions used by physical therapists to improve shoulder ROM often include modalities, joint mobilization, soft tissue mobilization, and therapeutic exercise.[2-6] While some authors have explored the impact of posture and scapular movement on shoulder ROM, no specific studies investigated the effect of chest wall shape and mobility of the thoracic cage on shoulder complex ROM.

While the chest wall is the base upon which the scapula moves and creates the scapulothoracic gliding surface, little attention has been directed to how its shape and structure may affect scapular function as existing studies primarily focus on scapular kinematics.[7] Research on the contribution of the thorax to shoulder kinematics is limited to studying force transfer through the kinematic chain and the effect of thoracic spine (TS) kyphosis on shoulder motion and function.[8] Descriptive studies have evaluated "the difference in the shape of the upper part and lower part of the scapulothoracic gliding surface," but no study has examined the impact of chest wall shape or movement on shoulder function.[9,10] The purpose of this case study is to describe the effect of interventions directed primarily to the ribcage and TS on shoulder complex ROM.

Case Description

A 66-year-old male patient (body mass index, 23.5 kg/m2, left-hand dominant) presented for physical therapist evaluation of bilateral shoulder and neck pain, as well as intermittent left upper extremity radicular symptoms over 2 years. Previous treatment history included a prior course of physical therapist care focused on shoulder strengthening, improving his posture, and avoidance of lifting, resulting in some improvement. However, due to a plateau in progress, he consulted with an orthopedic surgeon who recommended shoulder replacement surgery. A second opinion with a physiatrist resulted in a diagnosis of generalized joint hypermobility (GJH). Generalized joint hypermobility is considered on a spectrum of disorders that may be asymptomatic or clustered with multisystemic comorbidities, including joint subluxations/dislocations, chronic diffuse pain, headaches, fatigue, postural dizziness, and/or gastrointestinal manifestations.[11] Generalized joint hypermobility is typically diagnosed clinically by evaluating the patient on the Beighton scoring system (BSS).[11] The BSS has low sensitivity and is influenced by age, ethnicity, and sex, but it is specific for identifying GJH.[12] The patient's BSS was 4/9, which is consistent with GJH in males aged 8 to 30 years.[12] The cut-off score has not been established for older adults. The patient was referred to physical therapy to address impairments associated with GJH that may have overlapped with his shoulder symptoms.

Generalized joint hypermobility has been associated with breathing disorders.[13] Though the patient did not report breathing difficulties, he was observed to have a flared ribcage that persisted both during inhalation and exhalation. Clinically, patients with GJH may be observed holding their breath during tasks, perhaps to increase postural rigidity and compensate for lack of stability. The flared ribcage that can result from repeated reliance on this postural fixation strategy is hypothesized to alter the osteokinematics of the shoulder complex. Report of neck pain and radicular symptoms warranted screening the cervical spine, but ROM was symmetrical and pain-free and bilateral Spurling test was negative (sensitivity 95%, specificity 94%).[14]

Review of systems revealed a height loss of 1.9 cm (0.75 inches) over the past few years, a risk factor for osteoporotic fracture and a precaution for joint mobilization procedures.[15] No additional disease or surgery was reported. Patient indicated that his primary goal was to avoid shoulder replacement surgery; other goals included decreasing pain, identifying well-tolerated exercises to improve his physical activity status, sleeping through the night, and reaching behind his back for hygiene and dressing activities.

Thoracic spine flexion and extension measured with an inclinometer were within functional limits, but lateral flexion ROM was limited bilaterally. While no studies on the reliability of inclinometry for TS lateral flexion have been published, it was selected as a convenient and clinically available objective measure. During respiration, the mid-TS ribs have been described to move similarly to a "bucket-handle", creating lateral costal expansion during inhalation.[16] A loss of lateral flexion is consistent with the inability of the ribs to return to resting position during exhalation. The shoulder girdle is also hypothesized to be maintained in an