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Rehabilitation techniques in ankylosing spondylitis management: a case report

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Ankylosing spondylitis (AS) is a chronic inflammatory disorder of the musculoskeletal system. Progressive complaints of axial stiffness and restriction in movement may not be addressed by general medical practitioners. While AS has a progressive natural history, chiropractors may play a significant role in early detection, patient education, and management. Early diagnosis and therapy may help to minimize future pain and disability. Chiropractic treatment methods coupled with individualized active rehabilitation techniques should be directed to reduce pain, minimize functional loss and optimize quality of life.
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KEY WORDS: ankylosing spondylitis, rehabilitation chiropractic.

La spondylite ankylosante (SA) est un trouble inflammatoire chronique de l'appareil musculosquelettique. Les plaintes évolutives ayant trait à la raideur axiale et à la restriction dans les mouvements ne peuvent être traitées par les praticiens de la médecine générale. Comme la SA a des antécédents évolutifs naturels, les chiropraticiens peuvent jouer un rôle significatif dans sa détection dès le début du trouble, dans l'éducation des patients et dans la gestion. Un diagnostic précoce et une thérapie peuvent aider à minimiser la douleur et l'incapacité qui s'ensuivent. Les méthodes de traitement en chiropractie jumelées à des techniques de réadaptation actives individualisées devraient contribuer à réduire la douleur, à minimiser la perte fonctionnelle et à optimiser la qualité de vie.
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MOTS CLÉS : spondylite ankylosante, chiropractie de réadaptation.

Introduction

Ankylosing spondylitis is a chronic inflammatory destructive arthropathy of the spine and peripheral joints affecting approximately 0.9 % of the population and afflicting men two to three times more frequently than women.[1] Symptoms generally manifest in young adulthood and take several years to demonstrate characteristic radiological changes.[2] Individuals with this disorder may present undiagnosed to a chiropractor's office.[3]

Case History

A 32-year-old male presented to a chiropractor's office with a primary complaint of progressive achiness and rigidity of his lower back which began in his early 20's. His lower back stiffness was worse upon waking and improved with movement. He stated it could take him up to one hour to "get going" in the morning. He was aware of restricted motion of the hips and shoulders for at least the past 3 years. He complained of fatigue and poor sleep.

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Physical activity was limited due to restricted breathing. He had not had any prior intervention despite a progressively worsening postural deformity and restricted movement. He had been reluctant to visit a general practitioner for his complaints and had only presented to a chiropractor upon insistence of family members.

Postural evaluation revealed pronounced thoracic kyphosis and anterior head carriage. He was observed to have protracted and internally rotated shoulders and stood with visible hip flexion. He exhibited muscle patterns typical of both upper and lower crossed syndromes.[4,5] Hypertonicity was noted in the suboccipital, upper trapezius, levator scapulae and pectoral musculature. The sternocleidomastoid muscles were pronounced and weakness was noted in the deep cervical flexors and lower scapular stabilizers. The hip flexors and lumbar erectors were shortened and tight, coupled with weak and inhibited gluteal and abdominal muscles. Altered movement patterns were noted for cervical flexion, shoulder abduction, hip extension and hip abduction. These altered movement patterns are characterized by dysfunction in the co-ordination of muscle firing sequences, as synergistic muscles compensate for weak and inhibited primary movers at a joint. Often these muscle reactions do not remain localized, but create a chain reaction which may involve the entire motor system.[4]

Physical examination revealed global decrease in active motion of the axial skeleton. On observation, chest expansion on inspiration appeared diminished and deep inspiration was accompanied by audible stridor. Trendelenburg testing was negative but poor balance was observed. Schober's test to assess lumbar spine motion in flexion (5.0 cms or greater considered normal) was measured at 2.0 cms.[6] On Thomas test there was observed hip flexion and knee extension indicating shortening of the iliopsoas and rectus femoris bilaterally. Straight leg raising was limited to 60 degrees bilaterally with complaints of hamstring tightness. Faber-Patrick's test was painful over the lumbosacral area bilaterally with restricted hip external rotation and abduction. Hyper extension maneuvers of the hip (Gaenslen's/Yeoman's test) were extremely uncomfortable even before passive overpressure was applied. Passive intervertebral motion could not be detected on manual palpation of the lumbar spine in both prone and seated position. Neurological testing was within normal limits in both upper and lower extremities.

Radiographs were taken to confirm the suspected diagnosis of AS. Characteristic radiographic findings for this individual include bilateral and symmetrical sacroiliac joint fusion (Figures 1 and 2), as well as indications of hallmark marginal syndesmophytes[7] anterior to the L3L4 disc space (Figures 3 and 4). Also visible is reactive sclerosis at the opposing L3L4 anterior vertebral body margins and a "squared" contour of the anterior aspect of L4 and L5.

Treatment

The patient was instructed in low-tech gym ball therapy protocols which provide safe, accessible, inexpensive, time-sensitive and progressive stretches and exercises, all of which contribute positively to compliance.[8] Further advantages of incorporating gym ball protocols in AS include the ability to easily adjust intensity, proprioceptive input and providing a comfortable exercise platform which increases the likelihood of participation. A daily home program was instituted given that the long-term results of this approach have been shown as effective as in-patient physiotherapy.[9]

In-office treatment was directed toward correction of the kinetic chain dysfunction. Manipulation of areas in the lumbar, thoracic and cervical regions maintain intersegmental movement ("soft" ankylosis)[6] and was performed bi-monthly. During acute periods of symptomatology, manipulation was withheld in favour of gentle mobilization within patient tolerance. Stretching techniques were performed in office and directed towards hypertonic postural muscles. Proprioceptive neuromuscular facilitation (PNF) approaches were preferred for several reasons; neuromuscular re-education of faulty movement patterns, active patient participation, the latitude to engage the patient within tolerance and the ability to adapt the techniques in a home setting. Two different types of PNF techniques were utilized: hold-relax and contract-relax.[10] Hold-relax, which provides an isometric contraction, was used on more symptomatic areas where contract-relax incorporates isotonic resistance, and was used on less provocative areas. Eye movements and breathing methods were incorporated to facilitate relaxation and these techniques were encouraged for home stretches.

In-office exercise instruction was directed toward facilitation of weak and inhibited muscles; specifically, the gluteals, abdominals, deep neck flexors and lower scapu-

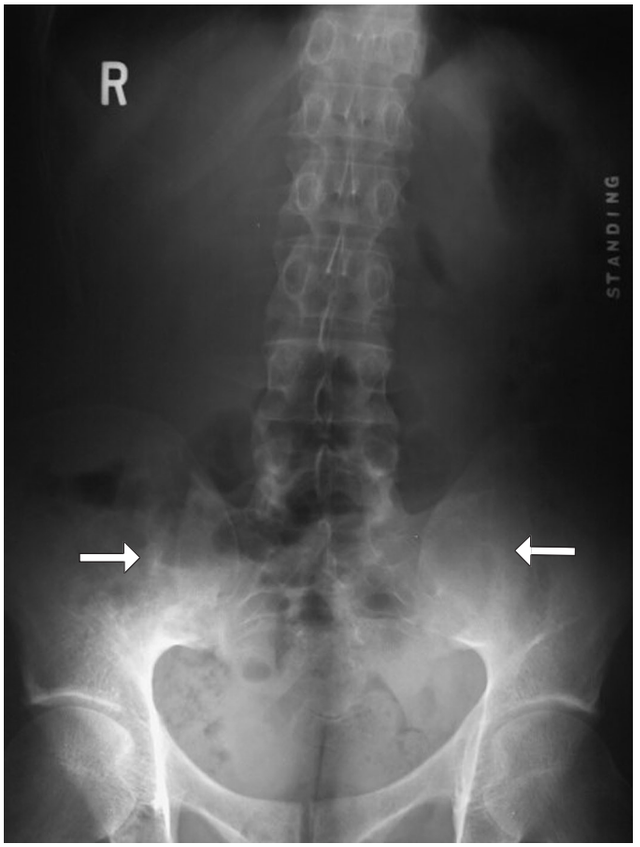

Figure 1.

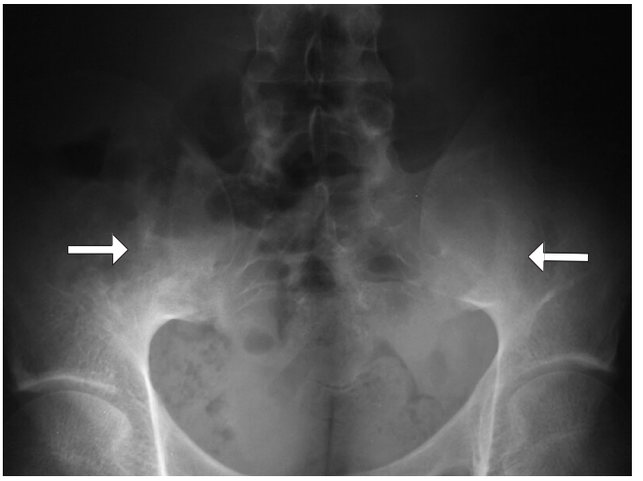

Figure 2.

lar stabilizers. The patient was taught abdominal hollowing and bracing techniques on the ball as these activities otherwise elicited pain when performed on the floor. Bridge track progressions on the gym ball and lunges were used to strengthen the gluteals as well as walking backwards on a treadmill to facilitate the gluteus maximus. Sensory-motor retraining was addressed using rocker board and balance sandals to facilitate the proprioceptive system in regulation of equilibrium and posture. The Brügger exercise[11] was reviewed seated on the gym ball increasing proprioceptive input while facilitating the lower scapular stabilizers and inhibiting the upper trapezius, levator scapulae, rhomboids and pectorals. Abdominal breathing was stressed to retrain his diaphragm and decrease the recruitment of accessory breathing muscles (i.e. scalenes). Postural correction, including chin retraction, was emphasized.

The patient was initiated with a graduated-intensity program of home exercises and stretches to become more comfortable on the gym ball, improve proprioception and perform gentle passive mobilization of the axial skeleton. As the patient enjoyed playing basketball, diminished breathing capacity was a concern so he was instructed to lie supine in extension on the gym ball while passively mobilizing the thoracic spine and costovertebral joints. He was encouraged to practice deep diaphragmatic breathing while performing this activity. He was advised to perform his home routine daily to maintain his current level of function.

Identification of occupational demands and strategies to address this patient's postural syndrome were essential. He was an internet technician and sat for several hours at a time working at a computer (he was encouraged to perform prescribed stretches frequently at work). As it had been several years since he had visited a general practi-

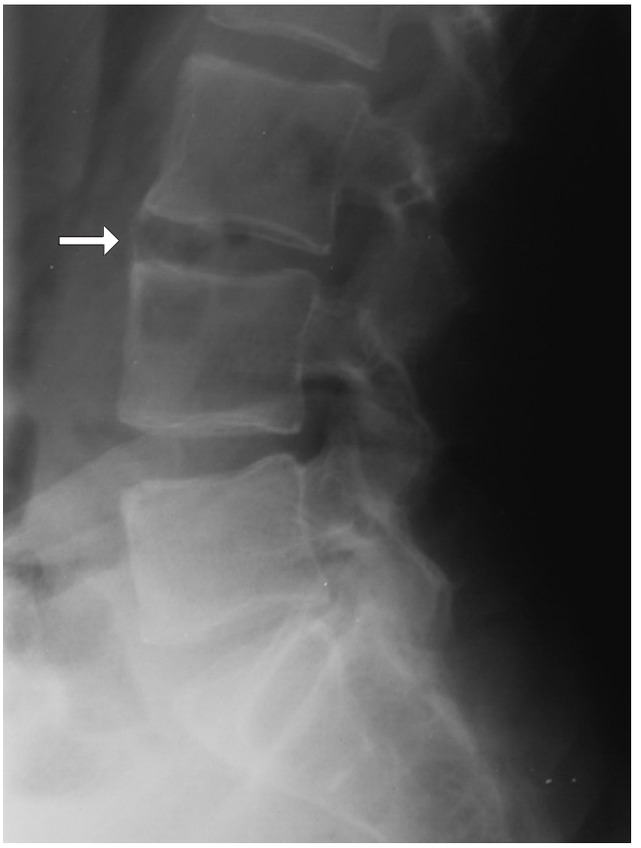

Figure 3.

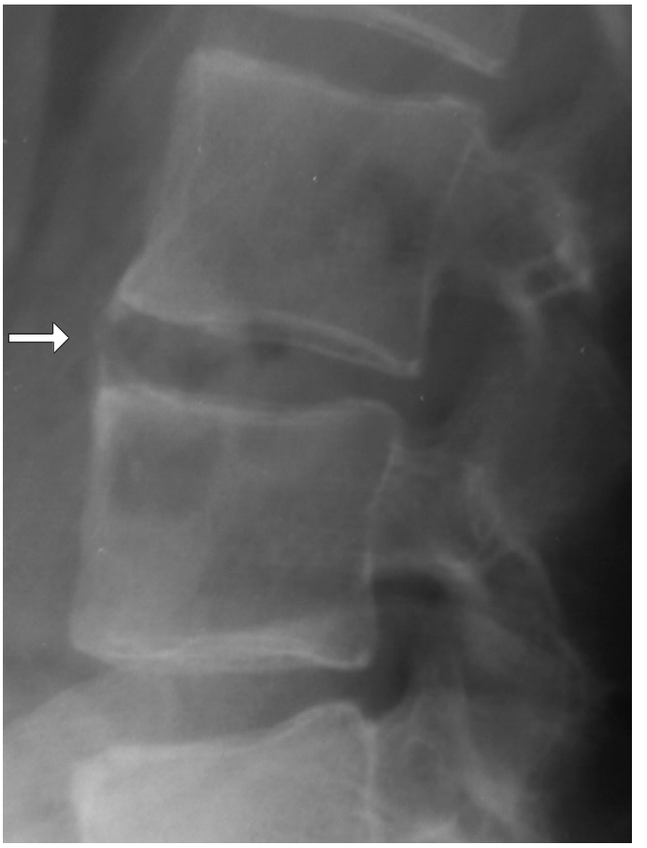

Figure 4.

tioner, he was also urged to attend a family physician who subsequently referred him to a rheumatologist.

Discussion

This case outlines an individual with complete SI ankylosis, but with only early signs of syndesmophytes in the lumbar spine. The patient presented with both upper and lower crossed syndromes and compromised chest expansion.

AS is a condition in which the characteristic deformity, history and examination often only requires radiographic investigation to confirm the diagnosis. While HLA B27 testing continues to be performed, it is non-specific with 6–8% false positive[7] and is not included in most current sets of diagnostic criteria for this spondylarthropathy.[12] ESR may be used as an indicator in acute episodes and may be warranted during attacks of iritis or significant joint swelling[7] but is non-specific for AS. While the condition itself is benign and self limiting, associated fatigue[13,14] and significant sequelae have been noted such as respiratory distress, destructive arthropathies,[15] and osteoporosis which contributes to an increased risk of spinal fracture; both insufficiency/compression and transpinal fracture-dislocation.[16,17]

Due to the sporadic, progressive nature of AS, as well as its unknown etiology, management is difficult. Traditional approaches, including non-steroidal antiinflammatory drugs, should be pursued on a case-to-case basis. Chiropractic care including mobilization, manipulation, soft tissue therapies and utilization of physiotherapeutic modalities may all be appropriate passive therapies in the treatment of AS. More important for the long term management of this disorder are rehabilitation approaches which enable the patient to self-manage symptoms. Many different ap-

Table 1 Bath Ankylosing Spondylitis Functional Activity Index.
Reprinted with permission[21]

PLEASE DRAW A MARK ON EACH LINE BELOW TO INDICATE YOUR LEVEL OF ABILITY WITH EACH OF THE FOLLOWING ACTIVITIES DURING THE LAST WEEK.

N.B. An aid is a piece of equipment which helps you to perform an action of movement.
Example

EASY _____ **IMPOSSIBLE**

1) Putting on your socks or tights without help or aids (e.g. sock aid).

EASY _____ **IMPOSSIBLE**

2) Bending forward from the waist to pick up a pen from the floor without aid.

EASY _____ **IMPOSSIBLE**

3) Reaching up to a high shelf without help or aids (e.g. helping hand).

EASY _____ **IMPOSSIBLE**

4) Getting up out of an armless dining room chair without using your hands or any other help.

EASY _____ **IMPOSSIBLE**

5) Getting up off the floor without help from lying on your back.

EASY _____ **IMPOSSIBLE**

6) Standing unsupported for 10 minutes without discomfort.

EASY _____ **IMPOSSIBLE**

7) Climbing 12–15 steps without using a handrail or walking aid. **One foot on each step.**

EASY _____ **IMPOSSIBLE**

8) Looking over your shoulder without turning your body.

EASY _____ **IMPOSSIBLE**

9) Doing physically demanding activities (e.g. physiotherapy exercises, gardening or sports).

EASY _____ **IMPOSSIBLE**

10) Doing a full days activities whether it be at home or at work.

EASY _____ **IMPOSSIBLE**

proaches/exercises have been identified as beneficial in the treatment of AS. Swimming and in-patient physiotherapy are commonly recommended but are not always an option due to accessability, enjoyment/satisfaction and financial, as well as time concerns. These are just a few of the factors which adversely affect compliance.[18] Many studies have emphasized the importance of regular exercise to maintain therapeutic gains[9,19,20,21] as well as combating the effects of fatigue.[13,14] The importance of proprioceptive training[22] and the correction of kinetic chain dysfunction in the treatment of AS is also emphasized. In the case of AS, active and regular adherence to a home rehabilitation regime is essential.

The patient in this case continued to experience lower back rigidity but noted increases in mobility of the hip and shoulder joints. There was no change in Schober's test at 6 months. The Bath Ankylosing Spondylitis Functional Index (BASFI)[23] was utilized as an outcome measure for functional status in this case. The BASFI (Table 1) is a reliable instrument to measure patient function and can be used to identify change in patient perception of symptomatology. The test consists of 10 questions which are answered on a 10 cm visual analog scale. Questions 1–8 are activity specific (i.e. putting socks on, overhead reaching), related to function in AS, while questions 9 and 10 reflect the "patient's ability to cope with everyday life" (i.e. perform sustained activities such as sports and activities of daily living). This test was administered within one week of presentation, at one month, 3 months and 6 months. The most significant temporal changes for this patient involved the latter 2 questions, which corresponded with the patient's self-reported increase in cardiovascular endurance and tolerance for physical activity.

Conclusion

AS is an inflammatory arthrotide of unknown etiology characterized by an incremental loss of joint mobility. Rehabilitation should be directed to slow the progression of spinal and appendicular rigidity while increasing the function and quality of life of the patient. Specific rehabilitation interventions should maintain joint mobility and decrease postural deformity. Most importantly, patient response to a therapeutic approach should guide practitioners to appropriately alter protocols when faced with unique functional deficits.

AS by its very nature is progressive and unpredictable. The prognosis is daunting due to the natural history of this condition. Increases in function, range of motion, flexibility, conditioning and endurance may have significant physiological and psychological benefits. Rehabilitation must be tailored to the individual to promote the highest level of compliance and achievable goals.

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