FUNCTIONAL RESTORATION OF ANKYLOSING SPONDYLITIS PATIENTS USING DOCUMENTATION BASED CARE TREATMENT CONCEPT-PRELIMINARY RESULTS

Meral Kozakçuoğlu Prof. MD
Maltepe University, Dept. of Physical Medicine and Rehabilitation, Maltepe, Istanbul, Turkey

ABSTRACT

• Objective: Ankylosing spondylitis is a chronic, inflammatory rheumatic disease that causes arthritis of the spine and the sacroiliac joint thus affecting the mobility of the spine. The aim of this study was to evaluate effect of documentation based care program on range of motion and isometric muscular strength of the lumbar muscles during flexion, extension, rotation and lateral flexion in a group of patients with ankylosing spondylitis.

• Material and Method: Three patients with ankylosing spondylitis attending to functional restoration program using DBC were included in the study. Measuring and training units (DBC International, Vantaa, Finland) are used to measure the maximum isometric strength of the trunk muscles and mobility during flexion-extension, rotation and lateral flexion of the lumbar spine.

• Results: In patients with ankylosing spondylitis, functional restoration led to significant increase of motion in all planes. Increase of strength was noted during lumbar flexion, extension, rotation and lateral flexion.

• Conclusion: The efficiency of using DBC functional restoration program in terms of gain in range of motion and strength has been demonstrated on ankylosing patients.

ÖZET
ANKİLOZAN SPONDİLİT HASTALARINDA DOKÜMENTASYONA DAYALI TEDAVİ KONSEPTİ KULLANILARAK FONSKİYONEL RESTORASYON-PRELİMİNER SONUÇLAR

• Amaç: Ankilozan spondilit omurga ve sakroiliyak eklemlerde artrite neden olarak omurganın mobilitesini etkileyen kronik, inflamatuar bir romatolojik hastalıktır. Bu çalışmamızın amacı dokümentasyona dayalı tedavi programı (Documentation Based Care Treatment Program-DBC) alan anklizan spondilitli hastalarda lomber omurganın fleksiyon, ekstansiyon, rotasyon ve lateral fleksiyonu sırasında eklem hareket açılığının ve izometrik kas gücünü değerlendirmektir.

• Materyal ve Metod: Ankilozan spondilit tanısı ile takipte olan ve DBC ile fonksiyonel restorasyon programına devam eden üç (3) anklizan spondilit hastası çalışmaya dahil edildi. DBC cihazının ölçüm ve egzersiz üniteleri (DBC International, Vantaa, Finland) kullanılarak lomber omurganın fleksiyon, ekstansiyon, rotasyon ve lateral fleksiyon hareketleri sırasında mobilite ve maksimum izometrik kas gücü ölçümleri gerçekleştirilirdi.

• Bulgular: Mevcut çalışma DBC fonksiyonel restorasyon programının anklizan spondilitli hastalar üzerinde eklem hareket açılığını ve kas gücü açısından etkin olduğunu göstermektedir.

• Sonuç: Ankilozan spondilit hastalarında fonksiyonel restorasyon tüm planlarıyla eklem hareket açılığında ve kas gücünden artışa izlenmiştir. Lomber omurganın fleksiyon, ekstansiyon, rotasyon ve lateral fleksiyon hareketleri sırasında kas gücünde artışa izlenmiştir.


INTRODUCTION
Ankylosing Spondylitis (AS) is a member of a group of rheumatic diseases (spondyloarthropathies) affecting the spinal column. AS is a chronic, inflammatory rheumatic disease that leads to arthritis of the spine and the sacroiliac joint and eventually result in vertebral fusion termed as ankylosis. Diagnosis of AS is based on assessments of symptoms, evidence of decreased mobility and radiological changes in the sacroiliac joints.1 Ankylosis of the spine is a debilitating condition that can cause loss of spinal mobility and function thus impairs quality of life. Additionally, restriction of mobility appears to be an important factor for referral of patients with AS to hospital.²

Despite stiffening, spinal mobility should be maintained in AS.³ Rehabilitation is an essential component of the management of patients with AS. Even in patients with low back pain, it is postulated that the presence of persistent LBP causes patients to avoid daily activities, which may lead to physical deconditioning, both generally (e.g., loss of cardiovascular capacity) as specifically (e.g., loss of strength and endurance of paraspinal muscles).⁴

The aim of this study was to evaluate effects of DBC program on range of motion and isometric muscular strength of the lumbar muscles in patients with AS.

MATERIAL and METHOD
Three patients with AS attending to functional restoration program using DBC at a private outpatient clinic (MK) were included in the study. Patients with current nerve root entrapment with intolerable pain, cauda equina syndrome, spinal cord compression, tumors, instability of the spine, severe osteoporosis, previous spinal surgery, cardiovascular or metabolic conditions that could limit exercise capacity were excluded from the study. Also patients who have started but could not complete a minimum of 12 treatment sessions were excluded from the analysis. Patients were evaluated at baseline and completion of the restoration program.

Measurements
Specially trained physiotherapist at the outpatient clinic is responsible for the interview, measurement and treatment. Measuring and training units (DBC International, Vantaa, Finland) are used to measure the maximum isometric strength of the trunk muscles. The reliability of test results in the devices is acceptable test-retest correlations being higher than 0.90.⁸ The strength measurements include flexion-extension of the lumbar spine (DBC 130, DBC 110) rotation (DBC 120) and lateral flexion (DBC 150) on both sides of the lower spine. The results are recorded as the torque produced around the axis of the movement arm in proportion to the patient’s body (Nm/kg) so the results of patients of different sizes and weights are comparable. Mobility is measured with the same units using flexion, extension, rotation and lateral flexion movements similar to strength measurements. The movement amplitude and fixation mechanisms of the devices are→
adjusted to focus on the movement of the lumbar spine. The results are given as deviations from the neutral position (degrees).

### Functional Restoration Program

Functional Restoration Program aims to:
- Restore the range of motion
- Restore muscle coordination and movement control
- Improve muscle endurance
- Improve general condition
- Re-educate patients in the difference between normal physical loading and pain
- Reduce fear and avoidance behaviour

Functional Restoration Program combines specific exercises together with cognitive-behavioral support. The exercises progress gradually and are carried out under close supervision of trained staff. Cognitive-behavioral support includes individual education and "learning by doing". Towards the end of the program, a home exercise program is introduced to maintain the results. The treatment includes mobility and muscle exercises with specific equipment together with stretching and relaxation exercises, and functional muscle and coordination exercises with special emphasis to extensor muscles. The treatment is primarily based on equipment training; correct loading and range limiters ensure that exercises are performed in a painless range of motion and that they find their target in the lumbar spine. Restoration includes controlled movements in lumbar flexion/extension, rotation and lateral flexion.

Treatment is planned on the basis of initial strength and mobility measurements and records are kept of the progress. The treatment is begun with low loads for the first four weeks with the object of improving mobility and teaching coordination of the lumbar spine. The load is gradually increased and at the end of the program the patients are instructed to continue individual secondary prevention program twice a week.

The treatment of sessions average duration is 60 minutes. DBC software is a Microsoft Windows-based computer program for documentation, designing treatment programs and management of patient information. An evaluation of function, pain and impairment levels and overall treatment satisfaction is carried out of the conclusion of the program. We report range of motion and strength measurements before and after functional restoration program. Values are expressed as mean±standard deviation.

### RESULTS

The mean age of the study group was 33±10.58 years (25, 29 and 45 years). Duration of low back pain complaints ranges from 36-180 months. They completed 22±3.6 treatments sessions during 95±25.98 days.

As range of motion concerned, functional restoration led to significant increase of motion. The mean lumbar flexion increased from 43.3±7.6 degrees to 46.7±5.7 degrees, lumbar extension from 15.7±9.8 degrees to 24.7±4.9 degrees, lumbar left rotation 37±9.8 degrees to 56.3±10 degrees, lumbar right rotation from 40.7±11 degrees to 62.7±9.3 degrees, lumbar left lateral flexion from 34.7±10.5 degrees to 41.7±2.9 degrees and right lateral flexion from 36.3±10.3 degrees to 43.3±5.8 degrees. The mean strength of lumbar flexion increased from 0.8±0.5 Nm/kg to 1.1±0.6 Nm/kg, lumbar extension 0.8±0.2 Nm/kg to 1.6±0.7 rotation from 0.7±0.4 Nm/kg to 1.3±0.8 Nm/kg, right rotation from 0.6±0.3 Nm/kg to 1.1 Nm/kg ±0.6 Nm/kg, left lateral flexion from 0.8±0.5 Nm/kg to 1±0.6 Nm/kg, right lateral flexion from 0.8±0.4 Nm/kg to 1.1±0.6 Nm/kg.
DISCUSSION and CONCLUSION

The present study has demonstrated the efficiency of using DBC functional restoration program on AS patients. Since physiotherapy and exercise are often advocated in these patients accurate outcome measures are essential.\(^5\)

A growing body of research has suggested that exercise is a crucial component of AS management.\(^6\) Dougados et al have reported that physical therapy and exercise are necessary adjuncts to pharmacotherapy.\(^6\) The Cochrane review for physiotherapy interventions for AS published in 2005 have indicated that exercise performed by patients under supervision (compared with home exercise regimens) was beneficial for spinal mobility.\(^7\) More recent studies have further supported that exercise therapy should remain a mainstay of AS treatment complementing medical therapy.\(^8\) Extension exercises need to be emphasized in patients with AS. McNeill et al. have measured trunk strengths in patients with low-back problems and healthy controls and demonstrated that the patients had attempted extension strengths that were significantly less than their strengths in the other types of movements tested.\(^9\) Active therapies for low back pain include various efforts such as back school programs, and aerobic exercise to intensive strengthening exercises with training devices. DBC program is also an active treatment intervention allowing objective measurements in terms of mobility and strength. DBC functional restoration program have been used for patients with low back pain. Functional restoration emphasizes physical and behavioral improvements over pain eradication and relies heavily on guidance from repeated quantification of function.\(^10\) Giemza et al. have evaluated the efficiency of DBC functional restoration program on patients with low back pain was demonstrated including improvement of range of motion in all planes.\(^11\) DBC offers the advantage of providing objective measures for quantification of improvements. The study has certain limitations. Since DBC program requires a long term participation few patients could be included in the study.

Also, it should be noted that voluntary muscle strength is influenced by many factors such as motivation, fear that the action will cause pain or damage and emotional state.\(^12\) In the long term the functional gains obtained by DBC will be lost in case of detraining. The patients should adapt to changes in exercise habits and lifestyle in order to benefit from functional restoration provided by DBC.

REFERENCES

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