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Evaluation Of Morning Stiffness In Backache Clinical And Radiological Examination.

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ABSTRACT

Early morning stiffness is in general attributed to autoimmune diseases like Rheumatoid arthritis, but it can also be seen in degenerative condition and instability. In a patient who does not carry any other findings of rheumatoid, early morning stiffness occurs as a symptom possibly when patient turns from supine position to standing position while getting up in the morning. We decided to study the percentage who presented with low back ache with back stiffness and to radiologically assess them with regard to instability. In our study function radiographs were positive in 90% of patients. Abnormal rotation being most common at L5-S1 and abnormal translation most common at L4-5. There was correlation between lumbar instability and morning stiffness. Looking specifically for morning stiffness in low backache patients and excluding rheumatoid arthritis and spondylo-arthropathy, will allow physician to select a subpopulation of patients in whom functional radiography could be usefully performed and instability will be demonstrated.

Keywords: Early morning stiffness, lumbar instability functional radiography

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INTRODUCTION

Early morning stiffness is a common complaint in orthopaedic practice. It is primarily attributed to autoimmune diseases like Rheumatoid arthritis where activities reduce the pain. Such early morning stiffness can also be seen in degenerative condition of spine especially with instability. The duration of early morning stiffness varies among patients and its significance lies in duration of more than 1 hour. This has been listed as criteria in American rheumatology association. However in a patient who does not carry any other findings of rheumatoid, early morning stiffness occurs as a symptom. We decided to study the percentage who presented with low back ache with back stiffness and to radiologically assess them with regard to instability. We hypothesised that instability of spine can cause early morning stiffness, when patient turns from supine position to standing position while getting up in the morning.

METHODOLOGY

We included adult patients with low back ache and morning stiffness for more than 3 months and with history of morning stiffness. We excluded patients of low backache, who are diagnosed of spondyloarthropathy by Amor's criteria. We also excluded those patients with low back ache who are diagnosed of rheumatoid arthritis as per the American Rheumatism Association 1987 revised criteria. Also excluded were patients who are HLA B27 positive and patients with multiple other joint involvement.

There were 20 patients of which seven were males and 13 were females in the age group from 24 years to 65 years. The mean age was 39.9 years. Most of them were in the fifth decade. A detailed history was elicited in all these 20 patients regarding characteristics of low backache with particular emphasis on morning stiffness and thorough clinical examination done to perceive structural deformities, alterations in movements of spine and specific area of tenderness. (Figure 1 and 2).



Fig 1: Clinical profile from posterior aspect



Fig 2: Clinical profile from lateral aspect

Standard antero-posterior and lateral radiographs, as well as oblique views of lumbosacral spine were taken, Flexion- extension radiographs were taken. A strong triangular wooden block with cushions under the knees and the patients lean forward for the flexion radiographs. (Figure 3) For extension radiographs, the patient was made to stand on a slanting wooden platform on the floor, at the end of the examination table pressing the legs firmly against it and leaning backwards at the level of lumbosacral junction, with hands on the table for support. (Figure 4) Each film was made in a standard fashion with a tube-film distance of 40 inches.

The radiographs in flexion and extension is given in figures 5 and 6. Sagittal and angulatory displacements were measured as described by Dupuis et al as shown in figures 7 and 8. The angles of rotation were measured and given a positive notation if the angle lies in front of the spine and a negative notation if it lies behind the spine. Sagittal displacement of spine was taken as positive if the direction of displacement was anterior and negative if the direction of displacement was posterior. Translation is measured as shown in figure 9. Radiographic criteria described by Posner et al was used for the diagnosis of instability.



Fig 3: Extension view



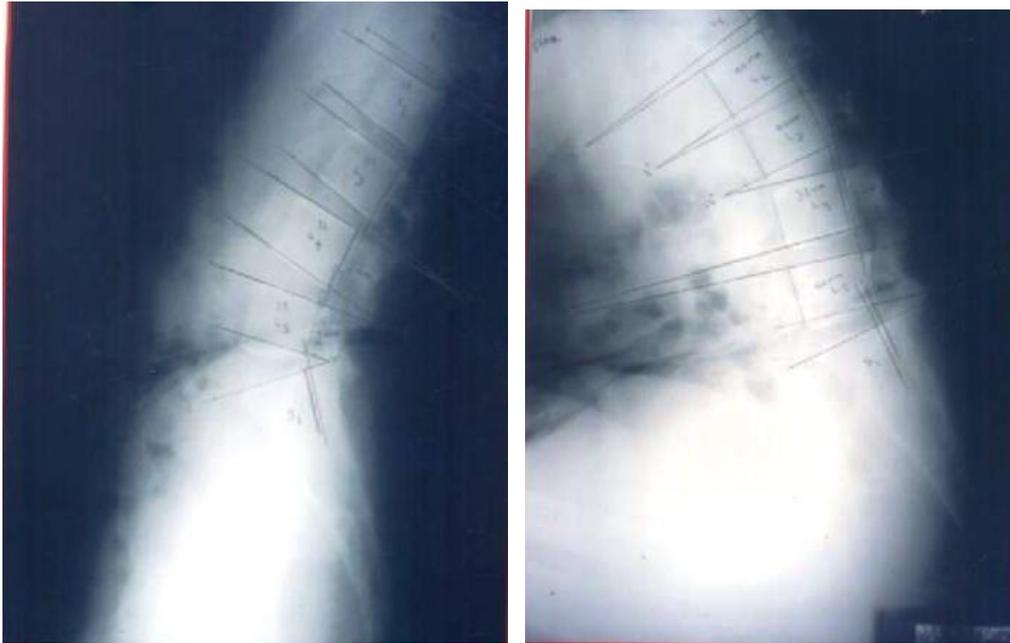
Fig 4: Flexion view



Fig 5: Extension radiograph of aspondylolisthesis patient



Fig 6: Flexion radiograph of the same Patient showing anterior translation of L4



**Fig 7: Measurement of rotation and translation
In extension view**

**Fig 8: Measurement of rotation and translation
in flexion view**



Fig 9: Anteroposterior radiograph of Lumbosacral spine with fracture L3 showing lateral translation

RESULTS

Table 1: Age Distribution of all our patients

Age (Years)	No. of patients
21-30	4
31-40	5
41-50	10
51-60	0
More than 60	4

The age of the persons included in the table 1. There were 13 (65%) females and 7 (35 %) males

The nature of work was Household work in 11 patients, sedentary sitting in 4 patients, prolonged standing in 4 patients, heavy manual in 1 patient. Body Mass Index calculations showed 2 patients as underweight, 7 patients ideal weight, 7 patients overweight and 4 patients obese. Primary Etiological factor leading to low backache and instability was found to be degenerative in 13 patients, post decompressive laminectomy in 2 patients, post-traumatic in 2 patients, infection in 2 patients, malignancy in 1 patient. All 20 patients had morning stiffness and 12 patients had stiffness in association with inactivity also. Duration of stiffness ranged from 10 minutes to 60 minutes (mean -26.15 minutes). Severity of stiffness was assessed by a visual analogue scale and it ranged from mild to severe (mild-1, moderate-11, severe-8). The location of backache was central in all patients, along with it 8 patients had pain radiating to the right leg and 3 patients had pain radiating to the left leg Backache and bilateral leg pain was present in 1 patient.

Duration of low backache ranged from 0.5 years to 4 years (mean 2.23 years). Severity of low backache ranged from mild in 1 patient, moderate in 5 patients and severe in 14 patients. Aggravating postures were sitting in 2 patients, standing at the same spot in 16 patients, forward bending in all patients, backward bending in 3 patients, sidebending in 2 patients, lifting weights in 12 patients, straining caused pain in 11 patients and walking in 11 patients. Handstrap sign was positive in 12 patients, all of them had aggravation of pain on standing at the same spot for few minutes and relieved on moving around. Nerve stretch tests were positive in 6 patients. Neurological deficit was present in only one case, who had a pars defect bilaterally and spondylolisthesis grade 2 at L4L5 and grade I at L5S1.

18 (90%) patients had atleast one level showing abnormal rotation or abnormal translation either in flexion or extension. 2 Patients (10%) did not have any value above that specified in Posner’s criteria even though they had clinical signs and symptoms suggestive of lumbar instability. Rotation was maximal in the L5S1 level followed by L4L5 level, while translation was maximal in L4L5 level followed by L5S1 level. Vertebral levels showing abnormal angles of rotation were as given below in table 2 and Vertebral levels showing abnormal translations were as given in table 3.

Table 2: Vertebral levels showing abnormal angles of rotation

Level	No. of vertebral levels showing abnormal rotation	
	Flexion	Extension
L1-L2	1	3
L2-L3	1	4
L3-L4	1	9
L4-L5	-	10
L5-S1	13	15
Total	16	41

Table 3: Vertebral levels showing abnormal angles of translations

Level	No. of vertebral levels showing abnormal translations	
	Flexion	Extension
L1-L2	2	1
L2-L3	1	3
L3-L4	5	7
L4-L5	4	10
L5-S1	6	7
Total	18	28

DISCUSSION

Segmental Instability is considered to be a significant factor in patients with chronic Low backache. However, there is considerable debate as to what exactly constitutes Spinal Instability due to lack of clear cut radiological and clinical criteria. Panjabi [3] redefined Spinal Instability in terms of a region of laxity around the neutral resting position of a spinal segment called the Neutral zone, which is influenced by interaction between the passive, active and neural control systems. Our study group of 20 patients were in the age group

of 24 -65 years (mean-39.9). 13 patients were female (65%), as in other studies where there was female preponderance (86%) in instability group, although females made up 56% of low backache patients. [4, 5]

55% of our patients had a lower level of physical activity. This correlated positively with a high BMI and flabby abdominal muscles. This group did not have any structural loss of bone or bony defect. The patients with ideal body weight or underweight patients had structural loss of bone due to infection, trauma or malignancy. This importance of the local muscle system in maintaining the segmental stability of the spine and the vulnerability of the spine towards instability, when passive sub-system of spinal stability is lost is already emphasized. [6]

In our study group two patients aged around 40 years had undergone complete discectomy L4-5 and L5-S1 with decompression laminectomy of L4-5 unilaterally. After 3-4 years, patients developed low back pain due to lumbar instability. Similar findings were observed by other workers where This has been studied by other workers who found patients in their forties are liable for this complication, which correlated to the degree of disc removed at surgery. [7] Infection, malignancy and trauma were other etiological factors in the study group. In our study, nerve stretch tests were positive in 6 patients (30%) and neurological deficit was seen in only one patient (5%). Range of active spinal movement revealed near normal range except for 3 patients. Similar findings were found in other studies [8, 9]. These are consistent with movement control problem within the neutral zone. On assessing functional x-rays of lumbar spine by applying Posner's criteria, 18 patients (90%) showed abnormal rotation or translation in atleast one vertebral level. 2 (10%) patients did not show any abnormality.

It has been observed that even dynamic x-rays are not gold standard investigation, as the range of normal and abnormal values overlapped, [10]. But our study found that increased and abnormal intersegmental motion of a single motion segment is considered to be significant only if it correlated with the clinical finding of lumbar segmental instability at the corresponding symptomatic level. [8]. Similar abnormal rotation in functional radiographs was found to be most prevalent at L5-S1 in other studies [10]. Abnormal translation was most prevalent at L4-5 and L5-S1 which correlated with previous studies only partially. L5-S1 had the least translation in previous studies. We believe, this difference could be due to inherent poor radiographic depiction of L5-S1. [10]. There was good correlation between the dominant lesion in the lumbar spine and the radiologic levels of instability.

SUMMARY

Lumbar segmental instability is considered to represent a significant subgroup within the chronic low back pain population. The problem lies in the difficulty in correlation between clinical instability and radiographic instability. The possible etiological or predisposing factors include female sex, low demand physical work in overweight or obese. If the patient has ideal BMI or underweight, infection malignancy and trauma may be the etiology. The age group was 40-50 years presenting mainly with morning stiffness ranged from 10 minutes to 30 minutes (mean 23.75), which was aggravated by lying down, inactivity and relieved by movement. It was usually of moderate severity and was expressed as a difficulty in moving. Central low back pain radiating infrequently to legs, aggravated by forward bending, prolonged standing and was relieved by moving around. Nerve stretch test were infrequently positive (30%), neurological deficit rare (5%). Range of movements were near normal, abnormal movements like instability catch seen only in 15% of cases in our study.

In our study function radiographs were positive in 90% of patients. Abnormal rotation being most common at L5-S1 and abnormal translation most common at L4-5. In the present study, we have brought out a correlation between lumbar instability and morning stiffness. Looking specifically for morning stiffness in low backache patients and excluding rheumatoid arthritis and spondyloarthropathy, will allow the physician to select a subpopulation of patients in whom functional radiography could be usefully performed. The demonstration of instability in these patients could lead to better management.

REFERENCES

- [1] Dupuis PR, Yong-Hing K, Cassidy JD, Kikaldy—Wills WR Radiologica' diagnosis of degenerative lumbar instability. Spine 1985; 10: 262-276.

- [2] Posner I, White AA, Edwards WT et al. A biomechanical analysis of the clinical stability of the lumbar K. Lumbo Sacral spine. Spine 1982; 7: 374-388
- [3] Panjabi M. The stabilizing system of the spine. Part I & II. Neutral zone and instability hypothesis. J. Spinal Disord 1992; 5: 390 and 5(4): 383-397.
- [4] Maigne Diagnosis and Treatment of pain of vertebral origin. Baltimore, MD : Williams and Wilkins, 1996: 135-41
- [5] Maigne JY. et al. Pain immediately upon sitting down and relieved by standing up is often associated with radiologic lumbar instability or marked anterior loss of disc space Spine 2003; 28(12): 1327-34.
- [6] Cholewickie J, McGill S. Mechanical stability of the in vivo lumbar spine Implications for injury and chronic low back pain. Clinical Biomechanics 1996; 11(1): 1-15.
- [7] Shaller B. Failed back surgery syndrome: The role of symptomatic segmental single level instability after lumbar microdiscectomy. Eur Spine J 2004;13: 193-98
- [8] Kirkaldy-Wills WH, Farfan HF. Instability of the lumbar spine. ClinOrthop 1982; 165: 110.
- [9] Paris PT: Physical signs of Instability. Spine 1985; 10(3): 277-9.
- [10] Hayes MA, Howard TC, Gruel CR. Kopta JA. Roentgenographic evaluation of lumbar spine flexion — extension in asymptomatic individuals. Spine 1989; 14 (3) 327-331.