Significance

This study shows the importance of measuring walking distance of patients before and after posterior spinal decompression surgery. It also aims to answer the question whether walking distance can be used as a tool to describe status of patient following surgery.

Introduction

This study aims at describing the use of measuring walking distance of patients pre and post surgery as an objective tool to assess the outcome of posterior spinal decompression. This study also aims at establishing correlation between the change in walking distance of patients and independent factors like age, gender, pre operative intervertebral disc height and pre operative intervertebral disc degeneration.

Methods and materials

This prospective study involved 76 patients who underwent posterior lumbar spinal decompression between December 2007 and October 2009. Spinal process osteotomy was performed in all the cases for access. Walking distance was defined as the total number of yards travelled by the patient in clinics under observation by the clinician. This was measured before surgery (Pre op WD), immediately following surgery (Post op WD) and on follow up in the out-patient department (WD-OPD). A maximum walking distance of 2000 yards was defined as the upper limit for statistical analysis. Changes in walking distance were also measured in both men and women between the three time points. Lumbar spine MRI scans were taken for all the patients pre operatively. Grading of the lumbar intervertebral disc degeneration was performed on T2 weighted images based on system described by Pfirrmann et al. Pre operative intervertebral disc height for each patient was measured on digital MRI scans at all the concerned levels. The mean follow up of the patients was 3.3 months following surgery. Of the total number of patients, forty one were males and thirty five females with a mean age (+/-2SD) of 68.8 years (+/- 15.5 years). 32 patients had single level surgery, 28 patients had surgery at two levels, 15 had surgery at 3 levels and 1 patient had decompression in all 4 levels. 18 (23.7%) patients had previous spinal surgeries performed.

SPSS (version 17) was used for statistical analysis and p value of <0.05 was considered significant. Mann-Whitney U test was used to compare independent variables and Wilcoxon Signed Ranked test was used to compare related variables.

Results

The mean walking distances measured pre operative, immediate post operative and in the out-patient department were 78, 355 and 829 yards respectively. There was a significant increase in walking distances between Pre op WD/Post op WD interval and between Post op WD/WD-OPD interval in both men and women (p<0.05). On comparing the changes in walking distance in men and women, increase in walking distance in men was not significantly different from women between pre-op and immediate post operative interval. However, the increase in walking distance in men was significantly higher between pre-op and WD-OPD interval compared to women. On comparing walking distances between men and women at 3 the three points described, men had significantly larger walking distances pre operatively and on follow up in out-patient department (p<0.05) but not immediately following surgery (p=0.33) (Fig 1). A significant correlation was seen between the increase in WD-OPD from pre-op WD and gender with males performing better (Spearman’s rho 0.261, p=0.039). Significant positive correlation was seen between the pre operative intervertebral disc height and the increase in WD-OPD from pre-op WD (Spearman’s rho 0.257, p=0.023), implying the increase in walking distance following is positively correlated to the pre operative intervertebral disc height. No significant correlations were found between Pfirrmann’s lumbar intervertebral disc degeneration grading and the change in walking distances. A significant positive correlation was seen between the changes in immediate post-op WD and WD-OPD compared to pre operative WD (Spearman’s rho = 0.4, p=0.001). No statistically significant correlation was found between the change in walking distances and other independent factors like age of the patient, American society of anaesthetists (ASA) grade and the time spent following surgery.

![Figure 1](image_url)

**Figure 1** Box plot showing walking distance at 3 time points in men & women

Conclusion

This study shows that walking distance of the patient can be used objectively as a measuring tool to assess the physical state of the patient before and after surgery. It also shows that men performed better than women following posterior decompression of the spine. Positive correlation between the change in post op WD/pre op WD and change in WD-OPD/pre op WD was seen to be significant. This could be used to predict the walking distance of patients in the community once the immediate post op WD is known. This study shows that male gender with larger lumbar intervertebral disc height are more likely to walk farther compared to other patients. No previous study has described the use of walking distance of patients as a tool to assess patient well being.

References