

Physiotherapy results after nucleoplasty

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Nucleoplasty is a method of surgery that has been referenced frequently, and is known to create minimal damage. However, there are limited publications that investigate physiotherapy techniques and procedures following the surgery. Our objective is to study the changes in the parameters of pain, disability, physical performance, kinesiophobia, fatigue, and physical activity of patients operated upon by lumbar and cervical nucleoplasties in the first, second, sixth, and twelfth months postoperatively. Twenty-four patients (15 lumbar, 9 cervical), underwent nucleoplasty surgery for lumbar or cervical disc hernia diagnosis in the Neurosurgery Department, Dokuz Eylül University Hospital in Izmir, Turkey, between 2005 and 2007, and patients' files were referred to the physical therapy department for exercise therapy and inspected retrospectively. Ethical approval for this study was obtained from the Human Ethics Committee of Dokuz Eylül University. The lumbar patients were given exercises for their abdominal muscles, back extensor muscles, and coordination¹ at one month postoperatively. They were asked to perform exercises 3 times a day with 10 repetitions up to the postoperative second month. All the measurements used in the standard assessments were repeated on the preoperative, postoperative discharge day, first, second, sixth, and twelfth months in our clinics. A Visual Analogue Scale (VAS) for assessing current pain intensity was used, consisting of a horizontal 100 mm line, with at one end the words 'no pain', and at the other end the words 'worst imaginable pain'. The levels of pain both in resting and activity were measured. Lumbar disability levels of the patients were evaluated by the Oswestry Disability Index (ODI), which was developed by Fairbank et al.² Cervical disability levels were measured using the Neck Pain and Disability Scale (NPDS), developed as a comprehensive measure of neck pain. To evaluate the physical performance of the patients, the following tests were used: 1. Total rolling time, 2. Sit and stand, 3. Fifty-foot walking test. 'Kinesiophobia' was measured by the Tampa scale. A fatigue scale was also used. In this sense, the evaluation of 'fatigue' demonstrated missing energy, weakness or missing activities, decline in the physical performance, and change in the level of daily activities. A Compendium of Physical Activities (CPA) scale was used to evaluate the intensity of every specific activity in casual as metabolic equivalents (METs).^{3,4}

It is clear from the general examination of our patients' pains at resting that when the maximum scores

were in the preoperative period, levels of pain tended to decrease significantly until the twelfth month. Pain during the sixth and twelfth months, when minimal levels of pains were observed, were less than those perceived during resting in the first and second month. Pains caused by activity measured as higher scores than those in the resting period were found to be as high as in the resting pains of the preoperative period, and decrease significantly in later months. The levels of disability in our patients were counted as lumbar and cervical indices in different scores. The patients exposed to nucleoplasty showed highest preoperative ODI scores, but significantly less disability levels in control assessments later. The lowest mean scores were obtained in the twelfth month. Those in the first, second, sixth, and twelfth months were seen to be remarkably less than that on the discharge day. The patients exposed to cervical nucleoplasty had as high disability scores as those undergoing lumbar nucleoplasty during the preoperative period, and their disability levels diminished during the controls. The disability scores of those operated on by cervical nucleoplasty in the second and twelfth months were significantly less than the preoperative scores. Those in the sixth month were less than those on the discharge day and in the second, and twelfth month scores, with the lowest mean scores being significant and lower than those on the discharge day and in the first month. Of the 3 performance tests measured, those in the first month were the worst ones, but improved in the later control measurements. Scores of total rolling time and lie/sit tests in the discharge day, first, second, sixth, and twelfth month measurements were more significant those on the preoperative day and changed for the better. Scores of total rolling time and lie/sit tests on the discharge day and in the first, second, sixth, and twelfth month measurements were more significant than those on the preoperative day and changed for the better. The first, second, sixth, and twelfth month measurements of both performances were significant and better than that on the discharge day. Those of the same performances in the second, sixth, and twelfth months proved significant and better than those in the first month. The score of the lie/sit test in the twelfth month was significant and less than that in the second month. The scores of the 50-foot walking test in the first, second, sixth, and twelfth months were better than those on the preoperative and on the discharge days, and those in sixth and twelfth months were significantly better than those in the first and second months, with the best ones being measured in the twelfth month.

It is evident from the kinesiophobia scores examined, that the worst scores were in the preoperative period, and those in the controls decreased significantly. Those in the first, second, sixth, and twelfth months were

significant and lower than that on the discharge day, and those in the second, sixth, and twelfth months than that of the first month. The best mean score in kinesiophobia was observed in the sixth month. Fatigue scores tended to decrease significantly as compared to that on the preoperative day until the sixth month, and increased slightly in the sixth and twelfth months, but not significantly. Those in the second, sixth, and twelfth months were observed to be more significant than that of the discharge day, and those in sixth and twelfth months than that in the first. Because the levels of physical activity in our cases were found to be too little to measure on preoperative and discharge days, they were not taken into account. The scores in the second, sixth, and twelfth months were seen to be significantly better than that in the first month, those in the sixth and twelfth month than that of the second month, and that in the twelfth month than that of the sixth month.

It follows from the classification of our patients according to whether they are exposed to cervical or lumbar nucleoplasties and assessments of the related results that distributions of the ages and body mass index in the corresponding groups were uniform. Comparison of the lie/sit testing, one of the performance tests in the first and twelfth months indicated that those exposed to cervical nucleoplasty had significant and better results than those with lumbar nucleoplasty. The 50-foot walking test showed that those exposed to lumbar nucleoplasty had better results than those of cervical nucleoplasty, with significant difference. Another difference between both groups is that kinesiophobia scores in the first and second months were better in those with cervical than those with lumbar nucleoplasty. In general, the worst scores were observed preoperatively, while activity pain was felt more severe than during resting. The patients with lumbar and cervical nucleoplasties presented similar results in view of resting and activity pains, which showed us that both groups indicated tendencies to improvement at equal rates and times. This result shows that although the pain of the lumbar patients did not differ from those in the cervical ones, their disability levels improved earlier than in those with cervical nucleoplasty. Performance scores showed significant variations from the discharge day on until the twelfth month as in the other results, with cervical nucleoplasty patients presenting better scores in the lie/sit test, and lumbar nucleoplasty patients giving better scores in

the 50 foot-walking tests. Kinesiophobia scores, which have so far been neglected by research on nucleoplasty patients, tended to improve in our study until the twelfth month. Cervical nucleoplasty case results were better than lumbar nucleoplasty case results in the first and second months, while the scores of kinesiophobia of both groups denoted no difference in the sixth and twelfth months.

Satisfaction was not found to depend on the interval between clinical onset and diagnosis or on the timing of surgery. The degree of return to activities of daily living (ADL) was significantly related to age, need for reoperation, type of disc herniation, and timing of surgery. The authors concluded that age and type of disc herniation are important to consider when deciding whether to operate on a patient and that return to ADL postoperatively correlated with disc disease recurrence.

In conclusion, the parameters influencing functionality need to be followed up long-term, beginning from the sixth and twelfth months after nucleoplasty surgery. As a suggestion, utilizing different evaluation methods will result in application of adequate physiotherapy programs.

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References

1. Koumantakis GA, Watson PJ, Oldham JA. Trunk muscle stabilization training plus general exercise versus general exercise only: randomized controlled trial of patients with recurrent low back pain. *Phys Ther* 2005; 85: 209-225.
2. Fairbank JC, Couper J, Davies JB, O'Brien JP. The Oswestry low back pain disability questionnaire. *Physiotherapy* 1980; 66: 271-273.
3. Yıldırım Y, Kara B, Erbayraktar S. Six month physiotherapy assessments on the patients exposed to the two different operations for their lumbar disk hernias. *Journal of Musculoskeletal Research (JMR)* 2009; 12: 1-10.
4. Yıldırım Y, Kara B, Teoman N, Genç A, Erbayraktar S, Acar U. The physical activity of patients after herniated lumbar disk surgery. *Neurosciences* 2008; 13: 421-425.