REVISTA SALUS
JOURNAL OF HEALTH SCIENCES

ORIGINAL ARTICLE

Microdiscectomy reduces low back pain in lumbar herniated disc patients

Thiago Cardoso Maia[1*], Charbel Jacob Junior[2], Igor Machado Cardoso[3], Marcus Alexandre Novo Brazolino[4], José Lucas Batista Junior[5], Tadeu Gervazoni Debom[6]

[1]* Specialist - Resident Doctor at Hospital Municipal Cármino Caricchio, São Paulo, SP.

[2] Master's Degree in Public Policies and Local Development, School of Sciences of Santa Casa de Misericórdia de Vitória - EMESCAM, Vitória-ES, Brasil.

[3] Specialist in Spinal Cord Surgery, Universidade Estadual de Campinas, São Paulo, SP.

[4] Specialist - Resident Doctor at Instituto de Assistência Médica ao Servidor Público Estadual, São Paulo, SP.

[5] Specialist - Resident Doctor at Santa Casa de Misericórdia de Juiz de Fora - MG.

[6] Specialist - Resident Doctor at Hospital Regional de Presidente Prudente - SP.

Article received on June 27 2015

Article accepted on August 19 2015

Keywords

Low Back Pain; Intervertebral Disc Degeneration; Discectomy; Quality of Life

Abstract

Objective: It is estimated that approximately 80% of the population will suffer from low back pain, which may be caused by lumbar disc herniation, impairing the quality of life of patients. Surgical intervention may be necessary in some cases when conventional treatment fails. Thus, we aim to assess quality of life and the low back pain score in patients who underwent surgical treatment for lumbar herniated disc through microdiscectomy. **Methods**: Prospective and comparative study in which we compared the results of questionnaires for quality of life (SF-36) and low back pain (Roland Morris) in patients during pre- and postoperative microdiscectomy, through Student's t-test, $p < 0.05$. **Results**: We evaluated 25 patients, 16 men and 9 women, with a mean age of 32.8 years old. There was an improvement in quality of life as indicated by the increase on the scores of all eight components of the SF-36 questionnaire: 1) physical functioning:

15.4 to 82.1; 2) role-physical: 0 to 83.3; 3) bodily pain: 16.6 to 80.9; 4) general health: 56.2 to 80.3; 5) vitality: 50.6 to 78.8; 6) social functioning: 32.3 to 88.5; 7) role-emotional: 20.8 to 81.9; 8) mental health: 60.2 to 79.5. Furthermore, there was significant decrease in Roland Morris questionnaire scores (preoperative: 17.5 ± 5.1 vs. postoperative: 0.9 ± 2.2), reflecting a reduction of low back pain during the postoperative period. **Conclusion**: We conclude that low back pain is present and often disabling for herniated disc patients and that there is reduction or complete relief from back pain after lumbar microdiscectomy is performed.

*Corresponding author
Email: th.cmaia@gmail.com

Introduction

Low back pain and lumbar sciatic pain are highly prevalent conditions among the world's population and often present lumbar disc herniation as their etiology, being one of the most common complaints of patients who seek for health care in emergency rooms and at doctors' offices. They are cause of significant disabling in everyday activities and growing labor absences due to the pain. Despite its high prevalence, there is still controversy among specialists and in medical literature regarding the proper way to manage the disease, leading to several different treatments and results.[1]

The initial treatment for most of the disc herniations is usually conservative, through the association of rest, analgesics, anti-inflammatory drugs and physical therapy. However, if the conservative approach fails for at least twelve weeks, there is indication for surgical treatment. Among the diverse surgical interventions indicated for disc herniations, it is important to mention microdiscectomy, low back arthrodesis associated to discectomy and, more recently, the interspinous dynamic stabilization or still the disc prosthesis.

Microdiscectomy or simple discectomy still remain the gold standard treatments since both procedures present less comorbidity, in which only the herniated segment is resected and there is neither overload of the levels adjacent to the discectomy, nor restriction to the lumbar arc of movement. The main advantage of the surgical procedure seems to be better seen in short term, showing relief of symptoms in 90% of cases when properly indicated.[2]

According to our group experience, we believe the low back pain is highly associated to lumbar disc herniation and, after microdiscectomy surgical intervention, there is significant relief of symptoms and an improvement in the quality of life for patients who suffer from the condition.

Thus, the aim here was to improve the understanding and management of the disease, with the objective of assessing the influence of microdiscectomy in quality of life and in low back pain for patients presenting lumbar disc herniation, quantifying these parameters via instruments validated by the medical literature: SF-36 and Roland Morris questionnaires, distributed in preoperative and late postoperative, for comparative analysis of the results.

Method

Comparative prospective study, conducted from the survey data collected via valid questionnaires, between pre- and postoperative periods. The study was undertaken from July 2009 to January 2010

with an average follow-up of 6 (six) months.

This work was authorized by the Research Ethic Committee at EMESCAM, under the number 012/2010, complying with the requirements of Resolution no. 196/96 of the National Health Council / Ministry of Health.

Patients included in the study suffered from low back pain for over three months, showing no response to conservative treatment (rest, analgesics and anti-inflammatory drugs and at least 20 sessions of physical therapy). All of them had lumbar disc herniation diagnoses confirmed by Magnetic Resonance Imaging (MRI).

Patients who showed previous surgical interventions on the spinal cord, radiographic parameters of intervertebral instability, lumbar canal stenosis, previous spinal cord trauma records, osteometabolic diseases and equine tail syndrome have been excluded from this study.

Initially, patients' personal and anthropometric data were collected via a questionnaire to assess quality of life, being applied during the preoperative period, named SF-36, and another questionnaire used to assess low back pain, named Roland Morris. The fill out of these specific forms was repeated after 6 months of post-operative.

SF-36 is a questionnaire for general health care assessment, validated and adapted to the Portuguese language, composed of 36 items, organized in 8 domains or components, which were determined in order to represent the most commonly assessed concepts in health care questionings, such as physical functioning, physical aspects, bodily pain, general health, vitality, social functioning, emotional aspects and mental health.[3-5]

Roland Morris questionnaire, also validated and adapted to the Portuguese language, is composed of 24 items and is a specific instrument for assessing low back pain. It allows the analysis of functional disabling in patients with low back pain, showing 24 situations which represent the individual's difficulty in performing daily tasks due to their low back pain, referring to the current symptoms.[6-8]

After the distribution of the questionnaires at the preoperative period, the patients underwent microdiscectomy. All of them received antibiotic prophylaxis in anesthetic induction and underwent hemilaminectomy for resection of the herniated disc fragment. The amount of disc removed was decided by the surgeon during the operation and the performing of microdiscectomy was in accordance with literature description.[9]

After the surgical procedure, the patients stayed in hospital for about 72 hours. After hospital discharge, they were evaluated every two months or when necessary. Six months after the surgery, the patients were reassessed and replied to the SF-36 and Roland Morris questionnaires again.

Data analysis

Data regarding age, gender, weight, height and BMI were analyzed and described and, after that, the results of both forms, for assessing quality of life (SF-36) and for low back pain (Roland Morris) were analyzed individually at the preoperative period and also six months after the surgery, when a comparative analysis was performed.

For the evaluation of the results obtained from SF-36, the answers for each question were turned into a score which, afterwards, formed the final score calculus for the 8 components. Each component was scored separately, ranging from 0 (zero) to 100 (one hundred) in which zero is the worst result possible and one hundred represents the best result for each component. The way of interpreting SF-36 may vary among different authors. In Figure 1, a summary of how the final results for each SF-36's component can be interpreted is shown.[4]

SF-36 component	Lowest score interpretation	Highest score interpretation
Physical functioning	Severe restriction when performing everyday physical activities, such as showering or dressing.	Performs all kinds of everyday physical tasks, including vigorous ones, without any limitations caused by health condition.
Role-physical	Issues at work or other daily activities as a result of health condition.	No issues at work or any other daily activity.
Bodily pain	Severe or extremely disabling pain.	No pain or disability.
General health	Poor personal evaluation of health condition and belief it will get worse.	Excellent personal evaluation of health condition.
Vitality	Feeling of tiredness or fatigue all the time.	Feeling dynamic and full of energy all the time.
Social functioning	Physical and mental health condition interferes frequently and seriously with social activities.	Physical and mental health condition do not interfere with social activities.
Role-emotional	Issues at work or other daily activities as a result of mental health condition.	No issues at work or any other daily activity.
Mental health	Feeling nervous and depressed all the time.	Feeling calm and happy all the time.

Figure 1: Summary of the possible results interpretation of each SF-36's component. Adapted from Ware, 2004.

It is worth emphasizing that the SF-36 application result analysis of and its comparisons must be performed for each component at study and not in an overall form in which the result is the sum of all answers given by the patient when filling out the form.[3]

The Roland Morris questionnaire[6-8] presents a single result that is represented by the amount of statements checked in by the patient, among the 24 situations exposed in the instrument. The absolute value does not imply absolute conclusions. It has to be compared with other situations for the same patient - in this case, the pre- with the postoperative period.

Results

25 patients were evaluated, 16 males (64%) and 9 females (36%), with a mean age of 32.8 ± 9.9 years old. The mean weight was 70.8 kg ± 10.5 and the mean height was 1.69m ± 0.1m, being the mean BMI 24.7 ± 1.7 $kg.m^{-2}$.

All the patients presented some reduction in quality of life, verified via the SF-36 questionnaire, mainly regarding the following components: physical functioning, role-physical and bodily pain. All the patients also presented low back pain, confirmed via Roland Morris questionnaire distributed at the postoperative period. The mean score was 17.5 ± 5.1, which shows that among 24 situations described in the questionnaire, 72% caused low back pain in the patients assessed in this study.

There was improvement in quality of life verified by the increase of all 8 components in the SF-36: 1) physical functioning: 15.4 ± 11.8 to 82.1 ± 21.2; 2) role-physical: 0 to 83.3 ± 35.9; 3) bodily pain: 16.6 ± 6.4 to 80.9 ± 22.8; 4) general health: 56.2 ± 24.3 to 80.3 ± 21.2; 5) vitality: 50.6 ± 27.9 to 78.8 ± 21.1; 6) social functioning: 32.3 ± 25.8 to 88.5 ± 22.7; 7) role-emotional: 20.8 ± 37.8 to 81.9 ± 39.0; 8) mental health: 60.2 ± 22.9 to 79.5 ± 19.9. The results in the first 4 components are grouped in Figure 2, as they represent physical health and the last 4 components are grouped in Figure 3, since they reflect mental health, as many authors have already suggested.[10]

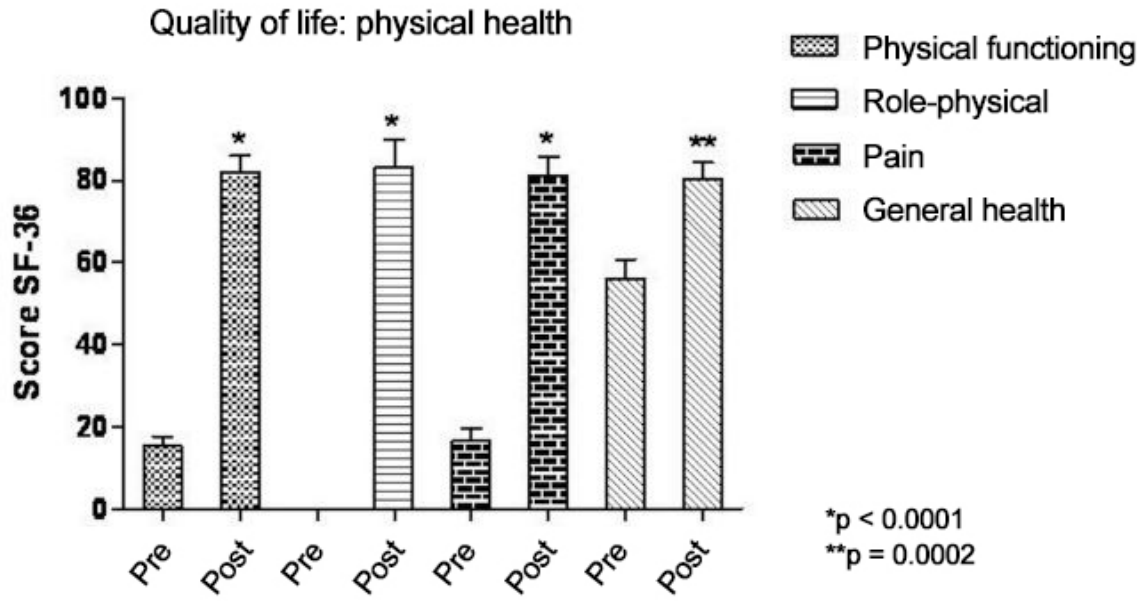

Figure 2: Quality of life (physical health) obtained via SF-36 questionnaire.

Source: author. Note: translated.

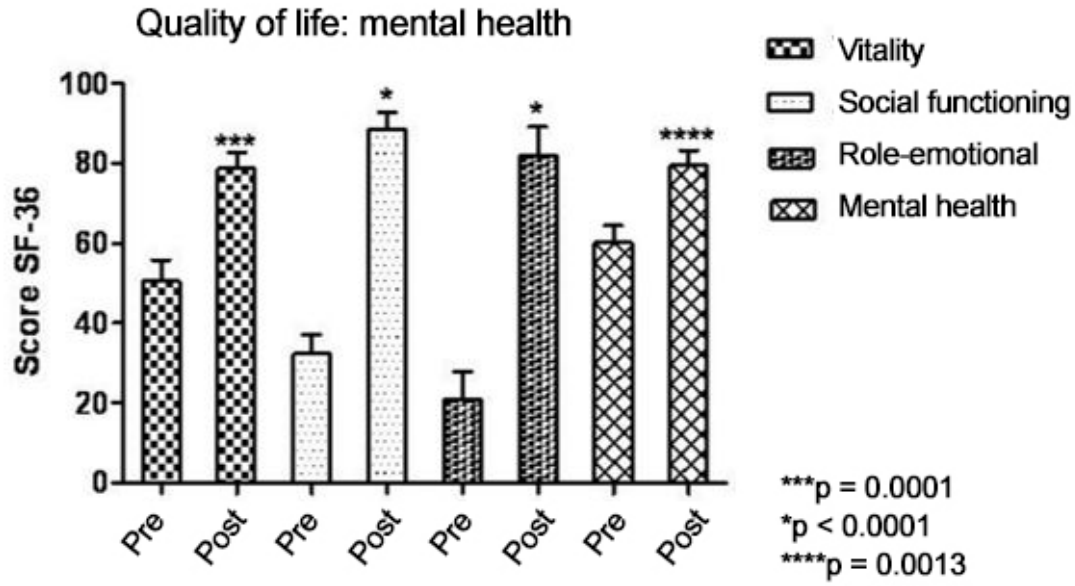

Figure 3: Quality of life (mental health) obtained via SF-36 questionnaire.

Source: author. Note: translated.

Besides that, there was a significant reduction in the Roland Morris questionnaire's score (preoperative: 17.5 ± 5.1 vs. postoperative: 0.9 ± 2.2), which shows reduction in low back pain at the postoperative period (Figure 4).

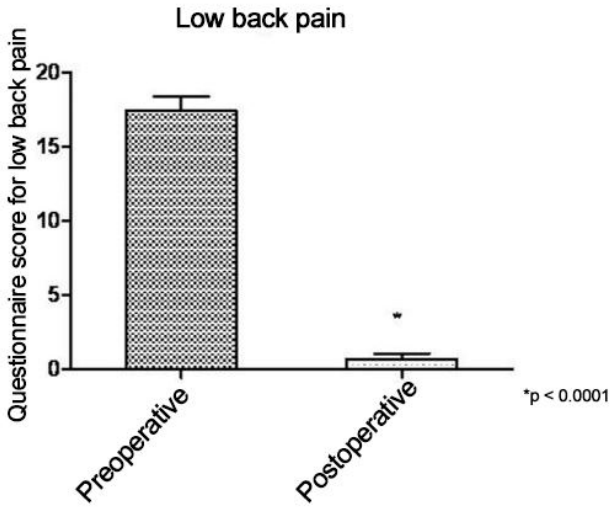

Figure 4: Low back pain represented through score of Roland Morris specific questionnaire.

Source: author. Note: translated.

Discussion

Lumbar sciatic pain is a frequent complaint among patients evaluated in emergency rooms and ambulatory care facilities for spinal surgery. It is estimated an incidence of 1 to 2% in the North American population, with approximately 200,000 discectomies performed annually in that country.[11] Among the available treatments, literature shows that lumbar arthrodesis surgeries increased about 200% between 1979 and 1987, in contrast to an increase of 23% in laminectomy and 75% discectomy in the same period. In spite of its high prevalence, there is much controversy regarding the physiopathology and the treatment of lumbar discpathology.

The main risk factors for disc herniation are: sedentarism, prolonged driving habits, chronic cough, pregnancy, smoking habits and heavy objects lifting.[12-14]

The natural history of the disease shows a benign evolution in the long term for the most of the lumbar disc herniations. Several authors showed similar results between conservative and surgical treatments after a long postoperative observation, thus being the statistically relevant short term relief of pain the main advantage of the surgical treatment.[2,15,16]

The initial treatment of every lumbar discpathology is always conservative, except in cases when the patient shows progressive neurological deficit or equine tail syndrome, when it is indicated urgent surgical decompression, due to the risk of permanent sequel. The size of the herniation cannot be taken into consideration for surgery indication, since large herniations are the ones which present the highest reabsorbing rates, since they are mostly formed by water, different from the small ones, which are not so frequently reabsorbed.[16-18]

The surgical treatment is reserved for those patients who suffer from disabling and unbearable pain after 12 weeks of conservative treatment and, at least, 20 physical therapy sessions.

Early surgical interventions with discectomy present more than 90% of positive results. However, when evaluated in the long term, the scores are less positive, 40% to 79% in a minimum 7-year follow up. It shows there is a deterioration of the results as the time passes after the surgery.[19,20]

Many surgical techniques are indicated, such as laminotomy and discectomy, endoscopic discectomy and microdiscectomy, with similar postoperative results.[21] Many factors influence the postoperative prognosis, such as the classification of the herniation, the level, the surgeon experience and the psychosocial aspects.

Complications related to the surgery include dura mater lesion, infection, nerve root lesion, recidivism, among others. Reherniation rates after discectomy vary from 3% to 18% in the literature.[22-24] Among the related aspects are great defect in the fibrous annulus and a bigger residual volume in the disc after surgery. In other words, fewer parts of the disc were extracted during the surgical procedure.[25]

In the last few years, the assessment questionnaires are becoming useful instruments either for evaluating postoperative results or to refer for treatments when there are several treatment options available for the same disease.[5,10,26] The objective analysis performed via clinical, laboratorial and radiological exams are being complemented by the assessment of subjective aspects, such as quality of life regarding health, physical functioning, pain and satisfaction scores, once it provides scarce information regarding the functional, social and mental aspects of the patient.[26] It has been aiding doctors to manage patients who suffer from lumbar sciatic pain.[27,28] For assessing quality of life, SF-36 was used, which evaluates the patient's health under their own perception. In this study, it was observed the significant improvement of subjective parameters related to the quality of life affected by the disease, namely physical functioning, role-physical, bodily pain, general health, vitality, social functioning, role-emotional and mental health.

The SF-36 and Roland Morris questionnaires were selected due to their more responsive approach to the prospective evaluation of patients with lumbar sciatic pain. Besides that, they are widely known, studied and reproduced in the scientific community.[8,29] Another well-known assessment method for low back pain is the *Oswestry Low Back Disability Questionnaire*[30], whose main disadvantage - in comparison with Roland Morris - is the difficulty and the longer time required to fill it out. This subjective analysis combined with the objective clinic evaluation allows the surgeon to have a more precise indication to the proper surgical procedure, improving the results and decreasing the number of postoperative complications, also allowing the quantification of subjective data at the postoperative period.

Another important aspect evaluated in our study was the association between lumbar disc herniation and low back pain. In developed countries, the "back pain" is quite prevalent and incident; approximately 70% of the people will suffer from it at some moment in life, being its incidence around 15% to 20% per year. It also represents the main cause of disability in adults under 40 years old and the second most frequent complaint in medical appointments. Approximately 1% of the North-American population presents low back pain constantly disabling associated to other 1% with temporarily disabling low back pain.[31]

We observed that miscrodiscectomy for the treatment of disc herniation reduces the low back pain condition in patients through the analysis of data obtained via Roland Morris and the bodily pain component in SF-36. Our results suggest that the unnecessary use of invasive surgeries in young patients can be avoided, since their high morbidity rates and complications.[32]

Clinical studies show no significant difference between patients who have undergone discectomy only and those who have been subject to discectomy combined with arthrodesis in the absence of instability[19]. The main advantage of arthrodesis compared with standard discectomy is the lower rate of disc disease recurrence[33], despite its higher morbidity.[32]

The lateral flexion-extension radiograph of the spinal cord was used as a method to determine intervertebral instability, considering the following criteria to indicate instability: vertebral slippage higher than 3mm, posterior opening of the vertebral bodies higher than 5 degrees, stenosis in the lumbar canal or disc herniation that requires extended decompression and multiple discectomies.[34]

For representing a non-consensual subject among experts, more studies are necessary to further evaluate the best way to understand and manage these patients. This study has showed that low back pain is present and, in most cases, disabling in patients with disc herniations and that, after undergoing lumbar microdiscectomy, there is a decrease or a complete relief from low back pain, followed by a significant improvement in quality of life, which strongly supports our idea that low back pain as a single criterion, without any instability sign to be seen in supplementary exams, must not be used for indicating lumbar spinal arthrodesis.

References

1. Rhee JM, Schaufele M, Abdu WA. Radiculopathy and the herniated lumbar disc: controversies regarding pathophysiology and management. J Bone Joint Surg Am. 2006;88(9):2070-80.

2. Ito T, Takano Y, Yuasa N. Types of lumbar herniated disc and clinical course. Spine. 2001;26(6):648-51.

3. Ciconelli RM. Tradução para o português do questionário de avaliação de qualidade de vida “Medical Outcomes Study 36 – Item Short Form Health Survey (SF-36)” [tese de doutorado]. São Paulo: Universidade Federal de São Paulo;1997.

4. Ware JE. SF-36 Health Survey Update. Spine. 2000;25(24): 3130-9.

5. Ciconelli RM, Ferraz MB, Santos W, Meinão I,Quaresma MR. Tradução para a língua portuguesa e validação do questionário genérico de avaliação de qualidade de vida SF-36 (Brasil SF-36). Rev Bras Reumatol. 1999;39(3):143-50.

6. Roland M, Morris R. A study of the natural history of back pain. Part I: development of a reliable and sensitive measure of disability in low-back pain. Spine. 1983;8(2):141-4.

7. Roland M, Morris R. Study of natural history of low back pain. Part II: development of guidelines for trials of treatment in primary care. Spine. 1983;8(2):145-50.

8. Nusbaum L, Natour J, Ferraz MB, Goldenberg J. Translation, adaptation and validation of the Roland-Morris questionnaire – Brazil Roland-Morris. Braz J Med Biol Res. 2001;34(2):203-210.

9. Canale ST, Beaty JH. Campbell’s Operative Orthopaedics. 11 ed. Editora Elsevier. 2007; 4(39):3652-68.

10. Martinez MC. As relações entre a satisfação com aspectos psicossociais no trabalho e a saúde do trabalhador [dissertação de mestrado]. São Paulo: Universidade de São Paulo; 2002.

11. Taylor VM, Deyo RA, Cherkin DC, Kreuter W. Low back pain hospitalization. Recent United States trends and regional variations. Spine. 1994;19(11):1207-13.

12. Kelsey JL, White AA 3rd. Epidemiology and impact of low-back pain. Spine. 1980;5(2):133-42.

13. Kelsey JL. An epidemiological study of the relationship between occupations and

acute herniated lumbar intervertebral discs. Int J Epidemiol. 1975;4(3):197-205.

14. Kelsey JL, Githens PB, O'Conner T, Weil U, Calogero JA, Holford TR, et al. Acute prolapsed lumbar intervertebral disc. An epidemiologic study with special reference to driving automobiles and cigarette smoking. Spine. 1984;9(6):608-13.

15. Weber H. The natural history of disc herniation and the influence of intervention. Spine. 1994; 9(19):2234-8; discussion 2233.

16. Saal JA. Natural history and nonoperative treatment of lumbar disc herniation. Spine. 1996;21(24 Suppl):2S-9S.

17. Reyentovich A, Abdu WA. Multiple independent, sequential, and spontaneously resolving lumbar intervertebral disc herniations: a case report. Spine. 2002;27(5):549-53.

18. Ahn SH, Ahn MW, Byun WM. Effect of the transligamentous extension of lumbar disc herniations on their regression and the clinical outcome of sciatica. Spine. 2000;25(4):475-80.

19. Frymoyer JW, Hanley E, Howe J, Kuhlmann D, Matteri R. Disc excision and spine fusion in the management of lumbar disc disease: a minimum ten-year follow-up. Spine. 1978:3(1):1-6.

20. Naylor A. Late results of laminectomy for lumbar disc prolapse. A review after ten to twenty-five years. J Bone Joint Surg Br. 1974;56(1):17–29.

21. Gibson JN, Grant IC, Waddell G. The Cochrane review of surgery for lumbar disc prolapse and degenerative lumbar spondylosis. Spine. 1999;24(17):1820-32.

22. Carragee EJ, Han MY, Suen PW, Kim D. Clinical outcomes after lumbar discectomy for sciatica: the effects of fragment type and anular competence. J Bone Joint Surg Am. 2003;85-A(1):102-8.

23. Thomé C, Barth M, Scharf J, Schmiedek P. Outcome after lumbar sequestrectomy compared with microdiscectomy: a prospective randomized study. J Neurosurg Spine. 2005;2(3):271-8.

24. Carragee EJ, Spinnickie AO, Alamin TF, Paragioudakis S. A prospective controlled study of limited versus subtotal posterior discectomy: short-term outcomes in patients with herniated lumbar intervertebral discs and large posterior anular defect. Spine. 2006;31(6):653-7.

25. McGirt MJ, Eustacchio S, Varga P, Vilendecic M, Trummer M, Gorensek M, et al. A prospective cohort study of close interval Computed Tomography and Magnetic Resonance imaging after primary lumbar discectomy factors associated with recurrent disc herniation and disc height loss. Spine. 2009;34(19):2044–51.

26. Lopes AD, Ciconelli RM, Reis FB. Medidas de avaliação de qualidade de vida e estados de saúde em ortopedia. Rev Bras Ortop. 2007;42(11/12):355-9.

27. Fisher C, Noonan V, Bishop P, Boyd M, Fairholm D, Wing P, et al. Outcome evaluation of the operative management of lumbar disc herniation causing sciatica. J Neurosurg. 2004;100(4 Suppl Spine):317-24.

28. Porchet F, Wietlisbach V, Burnand B, Daeppen K, Villemure JG, Vader JP. Relationship between severity of lumbar disc disease and disability scores in sciatica patients. Neurosurgery. 2002;50(6):1253-9; discussion 1259-60.

29. Beaton DE, Schemitsch E. Measures of health-related quality of life and physical function. Clin Orthop Relat Res. 2003; (413):90-105.

30. Fairbank JCT, Couper J, Davies JB, O'Brien JP. The Oswestry low back disability questionnaire. Physiotherapy. 1980;66(8):271-3.

31. Frymoyer JW, Nachemson A. Natural history of low back disorders. In The Adult Spine: Principles and Practice, edited by J.

W. Frymoyer. Vol. 2, pp. 1537-1550. New York, Raven Press, 1991.

32. Hanley EN, David SM. Current Concepts Review - Lumbar Arthrodesis for the Treatment of Back Pain. J Bone Joint Surg Am. 1999;81:716-30.

33. Rish BL. A comparative evaluation of posterior lumbar interbody fusion for disc disease. Spine. 1985;10:855-7.

34. Okuda S, Oda T, Miyauchi A, Haku T, Yamamoto T, Iwasaki M. Surgical outcomes of posterior lumbar interbody fusion in elderly patients. Surgical technique J Bone Joint Surg Am. 2007;89:310-20.27.

How to cite this article:

Maia T C, Junior C J, Cardoso I M, Brazolino M A N, Junior J Ls B, Debom T G . Microdiscectomy reduces low back pain in lumbar herniated disc patients, Salus J Health Sci., [online journal], 2016;2(1). Available at: http://www.salusjournal.org