DOI: 10.5137/1019-5149.JTN.13679-14.0
Received: 05.12.2014 / Accepted: 26.12.2014
Published Online: 04.03.2016

Original Investigation

Temperament and Character Profile in Failed Back Surgery Syndrome: A Cross-Sectional Clinical Study

Seniz AKCAY YALBUZDAG[1], Asiye Mukaddes EROL[2], Ilker SENGUL[1], Canan CELIK[3], Sezin SOLUM[2], Huseyin Utku ADILAY[4], Buket GUNGOR[5]

[1]Izmir Bozyaka Education and Research Hospital, Department of Physical Medicine and Rehabilitation, Izmir, Turkey
[2]Bursa Sevket Yilmaz Education and Research Hospital, Department of Physical Medicine and Rehabilitation, Bursa, Turkey
[3]Giresun University, School of Medicine, Department of Physical Medicine and Rehabilitation, Giresun, Turkey
[4]Bursa Sevket Yilmaz Education and Research Hospital, Department of Neurosurgery, Bursa, Turkey
[5]Bursa Sevket Yilmaz Education and Research Hospital, Department of Psychiatry, Bursa, Turkey

ABSTRACT

AIM: Some psychometric properties may predict the development of failed back surgery syndrome (FBSS). The aim of this study was to determine the pain, disability, and depression severity in patients diagnosed with FBSS, and to determine the temperament and character subgroups in comparison with control group.

MATERIAL and METHODS: Thirty-eight patients diagnosed with FBSS, and 35 patients with favourable outcome after lumbar spinal surgery were included to the study. Pain intensity, disability, depression scores, temperament and character profile were determined by the visual analogue scale (VAS), Roland Morris Disability Index, Beck Depression Inventory, and Temperament and Character Inventory.

RESULTS: Pain intensity, disability, and depression scores were higher in the FBSS group ($p<0.001$). There were no significant differences between temperament and character subgroups between study groups except one of the temperament subgroup, reward dependence ($p=0.05$). There was a negative correlation between self-directedness and leg pain severity in the FBSS group ($p=0.01$, $r=-0.400$).

CONCLUSION: No significant differences were found between the FBSS and control groups with respect to temperament and character profile but FBSS was the cause of severe pain, disability, and higher depression scores. This group of patients must therefore be evaluated psychiatrically and should also be subjected to a clinical examination, and they should be managed using a multidisciplinary approach.

KEYWORDS: Failed back surgery syndrome, Depression, Disability, Temperament, Character

INTRODUCTION

Failed back surgery syndrome (FBSS) is defined as persistent low back and/or leg pain after spinal surgery. The incidence of FBSS ranges between 10% and 40% and can increase up to 50% in microlaminectomy series (5, 31,32). The underlying causes of persistent postsurgical pain may be related to perioperative factors, and further, these factors may overlap. Of these factors, psychosocial factors such as depression, poor coping, anxiety, somatization, and hypochondriasis have been associated with the development of FBSS (5,17). It may also be considered as a part of a biopsychosocial problem. Additionally, secondary gain, loss of employment or inability to work may contribute to the decreased quality of life and coping with pain, and may result in an increase in disability. Although the ideal timing of the

Corresponding author: Seniz AKCAY YALBUZDAG
E-mail: senizakcay@hotmail.com

surgical decision is not well defined in the literature except for development of progressive motor loss or cauda equina syndrome, the failure of conservative care of 6 to 12 weeks is generally an accepted indication for surgery (5,28,32). As time passes until surgical treatment, physiological 'wind up phenomena' or central sensitization in the spinal cord and central nervous system may cause a chronic pain pattern. Chronic pain may eventually result in a more complicated clinical status and poor outcomes. Chronic pain, prolonged immobilization, inability to work, and diffuse atrophy may create a vicious cycle of pain, and may influence both conservative treatment and surgical outcome (28). The situation indicated above may constitute a rationale for the choice of earlier surgical interventions. However, the condition remains a challenge for neurosurgeons, algologists, and psychiatrists because of the underlying physical and psychosocial problems of FBSS.

Cloninger developed the Temperament and Character Inventory (TCI) which is based on a psychobiological model. It divides personality into two basic components, temperament and character. Whereas temperament is genetically homogenous and inherited, and is assumed to be stable through the lifetime, character is more prone to be influenced by the environment (6,7). Roughly, while temperament includes the genetic courses, character reflects the social and cultural aspects of personality. Cloninger classified temperament into four dimensions; novelty seeking (NS), harm avoidance (HA), reward dependence (RD) and persistence (P) (7). NS is a heritable bias with the measure of behavioural activation, such as exploratory activity in response to novelty and avoidance of frustration, and impulsiveness. HA is a heritable bias in the inhibition of behaviour such as pessimistic worry about future problems, avoidance behaviours, and fearfulness. HA individuals are more prone to inhibition of behaviours for avoiding novelty, tend to be timid, passive, and more prone to fatigue (7,8). RD is the maintenance of behaviours with dependence on approval, and easily influenced by others. It is more associated to the rated norms of community than other temperament features. P perseveres despite frustration and fatigue. The 3 measured character dimensions are self-directedness (SD), cooperativeness (C) and self-transcendence (ST). SD is defined as the ability or right to make own decisions, intentionality and willpower. C is empathy with other people, and is associated with the sense of being a part of society. ST, the degree of self, is viewed as a part of the universe (8).

The aims of this study were 1) to assess the personality components of FBSS patients and compare them with patients with favourable outcomes after lumbar surgical intervention, 2) to determine depression and disability severity in patients in the FBSS group, and to 3) to examine whether disability and depression are related to pain severity.

MATERIAL and METHODS

Subjects

A cross-sectional study was conducted in accordance with the Declaration of Helsinki. The study population consisted of two groups. There were 38 patients in FBSS group having 'exacerbation or continuing of symptoms' after the surgery. The control group consisted of 35 patients having a history of surgery due to low back pain, and having an outcome greater than neutral after surgery. Exclusion criteria of the study were inability or unwillingness to cooperate, persistence of concurrent medical conditions (cardiac, hepatic, renal, blood or circulatory disorders), presence of motor deficit, systemic disease that may be the cause of neuropathic pain (diabetes mellitus, vitamin B12 deficiency, chronic renal failure vs.), having any current or past Axis-I or II mental disorders, use of drugs that affect the central nervous system during the last month, non-steroidal anti-inflammatory drug or opioid use during the last week, and history of neurologic, rheumatologic, or endocrinologic disease. The study was approved by the local ethic committee with no: 2013/4/3 and informed consent was obtained from the participants before participating in the study and after all procedures. Those enrolled in the study underwent a medical examination, including a medical history.

Methods

Sociodemographic status, employment status, smoking status, education year, and degree of the patients were recorded. Number of lumbar spinal surgical intervention, presence of instrumentation, and elapsed time after the surgical intervention were also recorded.

The patients were questioned in detail about their lower back and leg pain during the last month. Pain severity was determined by using 0-100 mm visual analogue scale (VAS). The subjects were asked to mark the point corresponding to the pain during the past week. VAS pain scale measurement was performed to each patient for both leg and low back pain. Beck Depression Inventory (BDI), a 21-item self administered measure, was used to rate depressive symptomatology. Each item was scored between 0 and 3 points.

The Roland Morris Questionnaire, a self-administered disability scale consisting of 24 items, was administered to all participants. The scores range between 0-24, and higher scores reflect greater levels of disability (26).

The Turkish version of the TCI was used for the assessment of personality. The TCI is a self-administered questionnaire that consists of 240 items. The participant answers the 240 questions by choosing either "true" or "false". It takes about 20–30 minutes to complete. The assessment was done by an experienced clinical psychiatrist. The validity and reliability of the Turkish version has been demonstrated by Köse et al. (19).

Statistics

The SPSS 11.5 software package for Windows was used for all analyses. Categorical variables were compared between the groups using the Chi-square test. While normally distributed continuous variables were compared using the t-test, non-normally distributed continuous variables were compared using the Mann-Whitney U test. The correlation between BDI, Roland Morris and pain severity was analyzed using Spearman's or Pearson correlation coefficients, as appropriate.

RESULTS

Demographic features of the patients and controls are given in Table I. There were no significant differences in gender, age, smoking, education, employment status, total number of surgery of lumbar spine, and instrumentation between the groups (p > 0.05) (Table I).

Lumbar and leg VAS, BDI and Roland Morris disability scores were significantly higher in the FBSS group (p<0.001) (Table II). The two groups were comparable with regard to temperament and character subgroups including NS, HA, P, SD, C, and SD. We found significant differences between the groups with respect to temperament subgroup RD with the control group having higher RD scores, but the significance level (p) was close to 0.05.

In the control subjects, a positive correlation was detected between lumbar VAS and leg VAS scores (p<0.001, r=0.696), lumbar VAS and Beck Depression scores (p=0.011, r=0.425), and leg VAS and Beck Depression scores (p=0.04, r=0.336). In the FBSS group, lumbar VAS was positively correlated with leg VAS scores (p=0.003, r=0.468). No correlations were found between lumbar, leg VAS, Beck depression and RM scores in the FBSS group (p>0.05). In the control subjects, there were positive correlations between leg VAS scores and ST (p=0.02, r=0.391), and between BDI scores and ST scores (p=0.01, r=0.411). In the FBSS group, there was a negative correlation between leg VAS scores and SD scores (p=0.01, r=-0.400). No correlations were found between pain and disability severity, depression scores and any other temperament and character variables. Although there was no significant correlation between lumbar VAS and SD, the significance level was close to 0.05 (p=0.052, r=-0.318).

DISCUSSION

In this study, BDI scores and disability scores were higher in the FBSS group compared to the control group. Except RD scores (subgroup of temperament), character profile and temperament was comparable between the groups.

Table I: Patient Characteristics and Temperament and Character Subgroup Values of Study Groups

	FBSS patients (n=38)	Control subjects (n=35)	p values
Age (years) (Mean ± SD)	48.9±10,9	48.1±11.1	>0.05[a]
Elapsed time after surgery (Month) (Mean ± SD)	32.1±1	14.4±21.8	0.04[a]
Sex			
Male	47.4% (n=18)	37.1% (n=13)	>0.05[b]
Female	52.6% (n=20)	62.9% (n=22)	
BMI (kg/m²) (Mean ± SD)	28.2±4.5	27.8±3.9	>0.05[a]
Smoke status			
Smoking	28.9% (n=11)	2.6% (n=10)	>0.05[b]
Not smoking	71.1 (n=27)	71.4% (n=25)	
Working status			
Working	23.7% (n=9)	25.7% (n=9)	>0.05[b]
Not working	76.3% (n=29)	74.3% (n=26)	
Spinal fusion surgery	13.1% (n=5)	11.4% (n=4)	>0.05[b]
Number of surgeries			
1	68.4% (n=26)	82.9% (n=29)	>0.05[b]
2 ≤	31.5% (n=12)	17.1% (n=6)	
NS [Median (min-max)]	15 (8-24)	15 (9-27)	>0.05[c]
HA [Median (min-max)]	19 (9-30)	17 (6-27)	>0.05[c]
RD [Median (min-max)]	13 (9-22)	14 (10-20)	=0.05[c]
P [Median (min-max)]	5 (1-8)	5 (3-8)	>0.05[c]
SD [Median (min-max)]	25 (14-36)	25 (17-38)	>0.05[c]
C [Median (min-max)]	19 (17-38)	27 (19-36)	>0.05[c]
ST [Median (min-max)]	21 (6-30)	20 (12-30)	>0.05[c]

SD: *Standard deviation,* ***NS:*** *Novelty seeking,* ***HA:*** *Harm avoidance,* ***RD:*** *Reward dependence,* ***P:*** *Persistence,* ***SD:*** *Self-directedness,* ***C:*** *Cooperativeness,* ***ST:*** *self-transcendence. Mean ±SD values determined for normally distributed variables. Median (min-max) values determined for variables that are not normally distributed.*
[a]Student's t test, [b]Chi-Square test, [c]Mann-Whitney U Test.

Table II: Pain Intensity, Disability Severity, and Beck Depression Index Scores of Patients with FBSS and Control Groups

	FBSS patients (n=38)	Control subjects (n=35)	p values
Lumbar VAS (cm) [Median (min-max)]	6.5 (0-10)	2 (0-8)	<0.001[c]
Leg VAS (cm) [Median (min-max)]	8 (0-10)	2 (0-8)	<0.001[c]
RM score [Median (min-max)]	20 (8-24)	6 (0-17)	<0.001[c]
BDI [Median (min-max)]	19 (1-41)	9 (0-34)	<0.001[c]

VAS: *Visual analog scale,* ***RM:*** *Roland Morris,* ***BDI:*** *Beck depression inventory. [Median (min-max)] values determined for variables that are not normally distributed. [c]Mann-Whitney U Test.*

RD score was significantly higher in the FBSS group, but the significance level was equal to 0.05. While there was a negative correlation between SD and leg pain in the FBSS group, there was a positive correlation between pain severity and BDI in the control group. ST, a character subgroup, was found to be associated with pain and depression in the control group.

FBSS, which is defined as persistent pain after spinal surgery and is a non-specific term that implies that the final outcome of surgery did not meet the expectations of the patient and the surgeon (27). Management of FBSS is a clinical challenge for neurosurgeons, algologists, and physiatrists because of pain severity, prolonged disability after the surgery and poor quality of life. In this study, we aimed to investigate whether the personality profile is different in FBSS individuals compared to the individuals with favourable outcome after lumbar surgical intervention but we found no difference between the groups with respect to character and temperament profile with the exception of borderline significance in RD. The second aim of the study was to examine the interaction between pain intensity, depression, and disability developed due to low back pain. The results showed us that pain severity disability and depression were not correlated in the FBSS group. On the other hand, pain severity, and depression was positively correlated in control subjects.

The most common structural causes of FBSS were foraminal stenosis (25–29%), painful disc (20–22%), pseudoarthrosis (14%), neuropathic pain (10%), recurrent disc herniation (7–12%), instability, facet pain (3%), and sacroiliac joint pain (2%) (3,27,29,33).

Nearly 20% of the patients undergoing spine surgery will require secondary surgery due to persistent pain or surgery-related complications (1,23). Success rates may decrease to 30% after a second surgical intervention, 15% after the third, and 5% after the fourth surgical intervention (1,15). In our study, the maximum surgery number was 3 in the FBSS group and 2 in the control group, and there were no statistically significant differences between the groups with regard to the number of surgeries.

The success of surgical outcome may depend on the predominant aim of the surgical intervention. The reduction of leg pain or sensory disturbances and/or walking capacity is the most important outcome of decompression surgery for a herniated disc or spinal stenosis. For 'chronic degenerative low back pain', the relief of low back pain is the primary factor for success (22). In the present study, a significant positive correlation was found between leg pain severity and ST scores in the control group. One of the character dimensions, ST consists of the self as viewed as a part of the universe (8). High scores of ST have been associated with paranoid, schizotypal, narcissistic symptoms (30). Gencay-Can et al. (11) found higher ST scores in patients with fibromyalgia syndrome, and posttraumatic stress was associated with higher scores of ST as well (34). We also found a negative correlation between leg pain severity and SD scores in the FBSS group, whereas the correlation was close to the significance limit between lumbar pain and SD. In the literature, lower SD scores had been associated with personality disorders (2,7,8). Subjects with low SD scores are defined as untrusting and incapable, blame others because of their problems, and are inadequate in achieving their goals (6-8). Although the scores of SD were similar in both groups, the inverse relationship between pain severity and SD scores in the FBSS group may be a result of the prolonged pain experience. Low levels of SD dimension of character have been identified in several clinical studies, and were associated with chronic pain (2,11,23). Most of these studies investigated fibromyalgia, migraine or tension type headache. Unlike previous reports, we did not find higher HA, lower SD scores in the FBSS group, but we found a negative correlation between leg pain intensity and SD scores in the FBSS group. Our study sample included patients who underwent surgical intervention due to low back pain. Although the mean HA score was higher in the FBSS group than the control group, a statistical difference was not determined.

The American Psychological Association has defined personality as 'deeply ingrained patterns of behaviour, includes the one relates to, perceives, and things related environment and oneself' (22). We can understand from this definition that personality may influence the individual's reactions to pain and spinal surgery.

To the best of our knowledge, this is the first study investigating the temperament and character profile of patients with FBSS by using TCI. Preoperative evaluation and determining the expectations of the surgeon and patient are important for the management of low back pain since multiple factors may contribute to the development of FBSS. Assessment of the patient's history and medical records for pre-surgical evaluation of the tendency to depression, anxiety and satisfaction may also help in estimating the surgical outcomes. The most

common psychiatric disorders in patients with low back pain are depression, substance abuse disorder, and anxiety (25). It is also important to distinguish structural problems from somatization. In a review by Schofferman at al., clinicians were of the opinion that individuals had a somatization disorder if they talked only about symptoms. Those patients with absolute surgical indications but with problems of personality should be cautioned that the outcome may be less optimal than expected (27). Chronic pain and undergoing surgery are associated with depression (22). Greenough et al. reported that 'psychological distress' was a predictor of poor outcome after anterior fusion surgery (12,13). Depression, anxiety, poor coping, somatization and hypochondriasis are psychological factors that have been found to result in poor outcomes after spinal surgery (9,14,20,24).

Personality disorders must be taken into consideration in patients with FBSS in addition to structural causes such as foraminal stenosis, herniated disc, and pseudoarthrosis. The personality profile and previous psychiatric disorders may influence surgical outcomes. Psychosocial invention may be required in these individuals because of prolonged pain, disability and depression. In our study, we determined BDI scores after the surgery, so we cannot comment on the patient's status before the surgical procedure but we report that the BDI scores of FBSS group are significantly higher than the control group.

Higher HA and ST scores and lower SD scores have been found in fibromyalgia patients compared with healthy controls in the literature (21). High HA and low SD scores were reported in psoriasis, major depressive patients and chronic fatigue syndrome (10,16,18). Chronic pain patients have been characterized by prevailing harm avoidance and lower self-directedness scores (11). According to our results, there was an inverse association between leg pain, and SD scores as well in the FBSS group. In the control subjects, a positive correlation was found between leg pain, and ST, also, Beck depression scores, and ST scores.

TCI takes 30 minutes, some items are difficult to respond to, and calculation of test scores is complicated. According to our experience during the study, many of our patients could experienced difficulties in understanding some items and needed the investigator's support. In further studies, authors may utilize TCI for subjects with similar education profiles. We aimed to determine whether there were differences between temperament, character profile, disability and depression between FBSS patients and patients who underwent lumbar spinal surgery with a good outcome. Although there were no personality differences between our groups, the FBSS group had higher disability and depression scores. Although personality profiles are similar, FBSS is a clinical challenge, and may end up with depression and disability.

Our study has several limitations. There is no record about the pre-surgical state of patients regarding pain severity, depression, temperament and character profile. Our sample size was small. Although we assigned patients to the control group according to their history of 'greater than the neutral outcome', they were also patients with pain experience that they had undergone the spinal surgery.

CONCLUSION

The management of FBSS may become a hard process for clinicians. The decision of the clinician may be related to the aetiology of FBSS. Recurrent surgery may not be logical because success rates of recurrent surgeries diminish gradually as stated above. Identifying predictors would have potential implications for patient selection, and risk factors may identify greater risk for pain and poor outcomes (4). A multidisciplinary management including physiatrists, neurosurgeons, algologists and psychiatrists is important. Because of the risk of recurrent surgeries, this patient group has priority with regards to chronic pain management and treatment of depression. Also, determining the expectation of the patient may lead to treatment planning before the surgery. Eventually, overcoming pain is not enough in FBSS management. Depression, anxiety, disability, and workplace modifications must all be considered during the follow-up process as well.

REFERENCES

1. Arts MP, Kols NI, Onderwater SM, Peul WC: Clinical outcome of instrumented fusion for the treatment of failed back surgery syndrome: A case series of 100 patients. Acta Neurochir (Wien) 154: 1213-1217, 2012
2. Boz C, Gazioglu S, Altunayoglu V, Hocaoglu C: Effect of serotonergic antidepressant therapy on temperament and character scales in patients with chronic tension-type headache. Psychiatry Clin Neurosci 61:534-542, 2007
3. Burton CV, Kirkaldy-Willis WH, Yong-Hing K, Heithoff KB: Causes of failure of surgery on lumbar spine surgery. Clin Orthop 157:191-199, 1981
4. Celestin J, Edwards RR, Jamison RN: Pretreatment psychosocial variables as predictors of outcomes following lumbar surgery and spinal cord stimulation: A systematic review and literature synthesis. Pain Med 10:639-653, 2009
5. Chan CW, Peng P: Failed back surgery syndrome. Pain Med 12: 577-606, 2011
6. Cloninger CR: Temperament and character. Curr Opin Neurobiol 4: 266-273, 1994
7. Cloninger CR, Svrokic DM, Przybeck TR: A psychobiological model of temperament and character. Arch Gen Psychiatry 50: 975-990, 1993
8. Cloninger CR, Thomas R, Przybeck TR, Svrakic DM. Wetzel RD: The temperament and character inventory (TCI): A Guide to its Development and Use. Center for Psychobiology of Personality, Washington University. St Louis, MO: 1994
9. Dumoulin K, Devulder J, Castille F, De Laat M, Van Bastelaere M, Rolly G: A psychoanalytic investigation to improve the success rate of spinal cord stimulation as a treatment for chronic failed back surgery syndrome. Clin J Pain 12: 43-49, 1996
10. Fukuda S, Kuratsune H, Tajima S, Takashima S, Yamagutchi K, Nishizawa Y, Watanabe Y: Premorbid personality in chronic fatigue syndrome as determined by the Temperament and Character Inventory. Compr Psychiatry 51:78-85, 2010
11. Gencay-Can A, Can SS: Temperament and character profile of patients with fibromyalgia. Rheumatol Int 32: 3957-3961, 2012
12. Greenough CG, Taylor LJ, Fraser LD: Anterior lumbar fusion: Results, assesment techniques and prognostic factors. Eur Spine J 3: 225-230, 1994

13. Greenough CG, Taylor LJ, Fraser LD: Anterior lumbar fusion. A comparison of noncompensation patients with compensation patients. Clin Orthop 300: 30-37, 1994
14. Hägg O, Fritzell P, Ekselius L, Nordwall A: Predictors of outcome in fusion surgery for chronic low back pain. A report from the Swedish Lumbar Spine Study. Eur Spine J 12: 22-33, 2003
15. Hazard RG: Failed back surgery syndrome: Surgical and nonsurgical approaches. Clin Orthop Relat Res 443:228-232, 2006
16. Hur JW, Kim YK: Comparison of clinical features and personality dimensions between patients with major depressive disorder and normal control. Psychiatry Invest 6:150-155, 2009
17. Hussain A, Erdek M: Interventional pain management for failed back surgery syndrome. Pain Pract 14:64-78, 2014
18. Kiliç A, Güleç MY, Gül U, Güleç H: Temperament and character profile of patients with psoriasis. J Eur Acad Dermatol Venereol 22: 537-542, 2008
19. Köse S, Sayar K, Kalelioğlu Ü, Aydın N, Ak I, Kırpınar I, Reeves RA, Przybeck TR, Cloninger CR: Mizaç ve Karakter Envanteri (Türkçe TCI): Geçerlik, güvenirliği ve faktör yapısı. Klinik Psikofarmakoloji Bülteni 14: 107-131, 2004 (In Turkish)
20. Long DM, Erickson D, Campbell J, North R: Electrical stimulation of the spinal cord and peripheral nerves for pain control a 10-year experience. Appl Neurophysiol 44: 207-217, 1981
21. Lundberg G, Anderberg UM, Gerdle B: Personality features in female fibromyalgia syndrome. J Musculoskel Pain 17:117-130, 2009
22. Mannion AF, Elfering A: Predictors of surgical outcome and their assessment. Eur Spine J 15 Suppl 1: S93-108, 2006
23. Martin BI, Mirza SK, Comstock BA, Gray DT, Kreuter W, Deyo RA: Reoperation rates following lumbar spine surgery and the influence of spinal fusion procedures. Spine (Phila Pa 1976) 32: 382-387, 2007
24. Pincus T, Burton AK, Vogel S, Field AP: A systematic review of psychological factors as predictors of chronicity/disability in prospective cohorts of low back pain. Spine 27: 109-120, 2002
25. Polatin PB, Kinney RK, Gatchel RJ, Lillo E, Mayer TG: Psychiatric illness and chronic low-back pain. The mind and the spine-which goes first? Spine (Phila Pa 1976) 18:66-71, 1993
26. Roland M, Fairbank J: Roland morris disability questionnaire and oswestry disability questionnaire. Spine 25:3115-3124, 2000
27. Schofferman J, Reynolds J, Herzog R, Covington E, Dreyfuss P, O'Neill C: Failed back surgery. The Spine J 3:400-403, 2003
28. Shapiro CM: The failed back surgery syndrome: Pitfalls surrounding evaluation and treatment. Phys Med Rehabil Clin N Am 25: 319-340, 2014
29. Slipman CW, Shin CH, Patel RK, Isaac Z, Huston CW, Lipetz JS, Lenrow DA, Braverman DL, Vresilovic EJ Jr: Etiologies of failed back surgery syndrome. Pain Med 3: 200-214, 2002
30. Svrakic DM, Draganic S, Hill K, Bayon C, Przybeck TR, Cloninger CR: Temperament, character, and personality disorders: Etiologic, diagnostic, treatment issues. Acta Psychiatr Scand 106:189-195, 2002
31. Taylor RS, Ryan J, O'Donnell R, Eldabe S, Kumar K, North RB: The cost-effectiveness of spinal cord stimulation in the treatment of failed back surgery syndrome. Clin J Pain 26: 463-469, 2010
32. Taylor RS, Taylor RJ: The economic impact of failed back surgery syndrome. Br J Pain 6:174-81, 2012
33. Waguespack A, Schofferman J, Slosar P, Reynolds J: Etiology of long-term failures of lumbar spine surgery. Pain Med 3:18-22, 2002
34. Yoon SJ, Jun CS, An HY, Kang HR, Jun TY: Patterns of temperament and character in patients with posttraumatic stress disorder and their association with symptom severity. Compr Psychiatry 50:226-231, 2009