Başarısız Bel Cerrahisi Sendromunda-Spinal Kord Stimulasyonu

Hasta seçim kriterleri ve algoritmalar

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BBCS-postlaminektomi sendromu

Karmaşık
Çok yönlü
Sosyoekonomik
Psikososyal
Çözülmesi ???

FBSS-postlaminektomi sendromu…

Bel cerrahisi sonrası bel±bacaklarda dayanılmaz ağrı, fonksiyon kaybı

QoL, depresyon

Predisposan faktörler:residüel-reküren disk, postoperatif sinir komp.,skar dokusu varlığı, depresyon, anksiyete, otoimmun hast., periferik damar hast.,

Failed back surgery syndrome, also known as postlaminectomy pain syndrome, is the end result of surgery of the lumbar spine in some patients and is characterized by intractable pain of the back and/or legs and varying degrees of functional incapacitation after surgery. Common symptoms associated with FBSS include diffuse, dull, and/or aching pain involving the back and/or legs. Patients also may experience sharp, burning, pricking, and/or stabbing pain in the extremities (17).

Interventional Techniques: Evidence-based Practice Guidelines in the Management of Chronic Spinal Pain

Mark V. Boswell, MD, PhD, Andrea M. Trescot, MD, Sukdeb Datta, MD, David M. Schultz, MD, Hans C. Hansen, MD, Salahadin Abdi, MD, PhD, Nalini Sehgal, MD, Rinoo V. Shah, MD, Vijay Singh, MD, Ramsin M. Benyamin, MD, Vikram B. Patel, MD, Ricardo M. Buenaventura, MD, James D. Colson, MD, Harold J. Cordner, MD, Richard S. Epter, MD, Joseph F. Jasper, MD, Elmer E. Dunbar, MD, Sairam L. Atluri, MD, Richard C. Bowman, MD, PhD, Timothy R. Deer, MD, John R. Swicegood, MD, Peter S. Staats, MD, Howard S. Smith, MD, PhD, Allen W. Burton, MD, David S. Kloth, MD, James Giordano, PhD, and Laxmaiah Manchikanti, MD

Pain Physician 2007; 10:7-111

3.5 Postlaminectomy Syndrome

Postlaminectomy syndrome and other synonyms, such as failed back surgery syndrome, represent a clus-
ter
exp
met
is common (466-489). Since discectomies, decompres-
sions, and spinal fusions and more recently, minimally

Hastanın ve hekimin beklentilerinin karşılanmadığı

Table 1 Etiology of failed back surgery syndrome

Preoperative factors
- Patient
  - Psychological: anxiety, depression, poor coping strategies, hypochondriasis
  - Social: litigation, worker compensation
- Surgical
  - Revision surgery (50% increase in risk in spinal instability [34] review)
  - Candidate selection (e.g., microdiscectomy for axial pain)
  - Surgery selection (e.g., inadequate decompression in multilevel pathology)

Intraoperative factors
- Poor technique (e.g., inadequate lateral recess decompression, misplaced screw)
- Incorrect level of surgery
- Inability to achieve the aim of surgery (e.g., far lateral discectomy)

Postoperative factors
- Progressive disease (e.g., recent disc herniation, spondylolisthesis)
- Epidural fibrosis (tethering effect, jeopardizing nutrition, and vascular supply to nerve root)
- Surgical complications (e.g., nerve injury, infection, and hematoma)
- New spinal instability (e.g., vertical stenosis)
- Myofascial pain development

ülke, ülke politikası,sosyo-kültürel özellikler,eğitim

Chan and Peng

Pain Medicine 2011; 12: 577–606
Wiley Periodicals, Inc.

An Update of Comprehensive Evidence-Based Guidelines for Interventional Techniques in Chronic Spinal Pain. Part II: Guidance and Recommendations

Pain Physician 2013; 16:S49-S283

1.0 Spinal Cord Stimulation

The indicated evidence for SCS is fair for long-term relief in managing patients with FBSS.

Table 6. Specialty Societies with Guideline Statements.

North American Spine Society (NASS)	British Pain Society (BPS)
American Society of Interventional Pain Physicians (ASIPP)	American Pain Society (APS)
Netherlands Society of Rehabilitation Specialists and Netherland Society of Anesthesiologists (VRA)	American Society of Anesthesiologists (ASA)
European Federation of Neurological Societies (EFNS)	American Society of Regional Anesthesia (ASRA)
American College of Occupational and Environmental Medicine (ACOEM)	Canadian Pain Society (CPS)

International Neuromodulation Society Critical Assessment: Guideline Review of Implantable Neurostimulation Devices

Timothy R. Deer, MD*; Simon Thomson, MBBS†; Jason E. Pope, MD*; Marc Russo, MD‡; Francis Luscombe, MD¶; Robert Levy, MD#

Neuromodulation 2014; 17: 678–685

Boswell et al. 2005 (8)	ASIPP	ASIPP	CRPS; FBSS		SCS is recommended for FBSS and CRPS; Strong for short-term management, moderate for long term	
Cruccu et al. 2007 (13)	EFNS	Not reported	CRPS, FBSS	Class II	SCS is efficacious in FBSS and CRPS	Level B
Hegmann 2008 (14)	ACOEM Guidelines (2008 version)		CRPS; FBSS	I	SCS is not recommended for acute, subacute, or chronic	FBSS: Insufficient Evidence
Rosenquist et al. 2010 (19)	ASA and the ASRA and Pain Medicine	Not reported	CRPS; FBSS; "other conditions" (peripheral neuropathic pain, peripheral vascular disease, postherpetic neuralgia)	CRPS: Category A3; FBSS: A3; "other conditions": B2	SCS should be used for persistent radicular pain, other conditions, CRPS, PHN, visceral pain, PVD, with demonstrated efficacious trial	

23 Çalışma :1822 hasta

Heterojen SCS grubu

Trial dönemde %32 kalıcı uygulanmaması…

TÜRKİYE

Kasım 2014-kasım 2015

95 trial-68 implant

%28 başarısız trial

The Appropriate Use of Neurostimulation: Avoidance and Treatment of Complications of Neurostimulation Therapies for the Treatment of Chronic Pain

Timothy R. Deer, MD[1]; Nagy Mekhail, MD, PhD[2]; David Provenzano, MD[3]; Jason Pope, MD[1]; Elliot Krames, MD[4]; Simon Thomson, MD[5]; Lou Raso, MD[6]; Allen Burton, MD[7]; Jose DeAndres, MD, PhD[8]; Eric Buchser, MD[9]; Asokumar Buvanendran, MD[10]; Liong Liem, MD[11]; Krishna Kumar, MD[12]; Syed Rizvi, MD[12]; Claudio Feler, MD[13,14]; David Abejon, MD[15]; Jack Anderson, MD[16]; Sam Eldabe, MD[17]; Philip Kim, MD[18,19]; Michael Leong, MD[20]; Salim Hayek, MD, PhD[21]; Gladstone McDowell II, MD[22]; Lawrence Poree, MD, PhD[23,24]; Elizabeth S. Brooks, PhD[24]; Tory McJunkin, MD[25]; Paul Lynch, MD[25]; Leo Kapural, MD, PhD[26]; Robert D. Foreman, PhD[27]; David Caraway, MD, PhD[28]; Ken Alo, MD[29,30]; Samer Narouze, MD, PhD[31]; Robert M. Levy, MD, PhD[32]; Richard North, MD[33,34*]

FACTORS ASSOCIATED WITH FAILURE OR SUCCESS

SCS is successful for the treatment of many chronically painful conditions, such as FBSS, chronic back pain, chronic neck pain, chronic radicular pain, chronic neuropathic pain, CRPS, and chronic pain from peripheral ischemia (7). SCS is also used for phantom limb pain, but the results have been mixed. Some authors have found that SCS provides minimal relief, with improvement for only 25% of patients (33,34). When treating chronic pain with neuromodulation devices, such as spinal cord stimulators, it is important to select the appropriate patients to achieve the best outcomes. Multiple indicators can help determine the effectiveness of neuromodulation with SCS; these include the experience of the implanter, the etiology of the patient's pain, early treatment, the existence of comorbidities that might cause failure or lead to complications, and a well performed psychologic evaluation to rule out neuromodulation therapy for patients with psychologic cause for pain, underlying psychoemotional distress, or schizophrenia. Concurrent psychiatric illness negatively impacts success rates of interventional pain therapy (35). An estimated 20% to 45% of patients with chronic pain concurrently suffer from psychiatric illness (36). Specifically, individuals with significantly depressed mood and those with low energy levels were at higher risk of failing their SCS trial (37). In addition, somatization, anxiety, and poor coping were important predictors of poor outcome, according to a recent systematic review of 25 studies (38). However, negative outcomes with these psychiatric illnesses and SCS are no different from those with other surgeries, such as spine surgery or knee replacement.

Spinal Kord Stimülasyonu

Hasta seçimi….

Hastanın değerlendirilmesi?

Ağrı tipi?

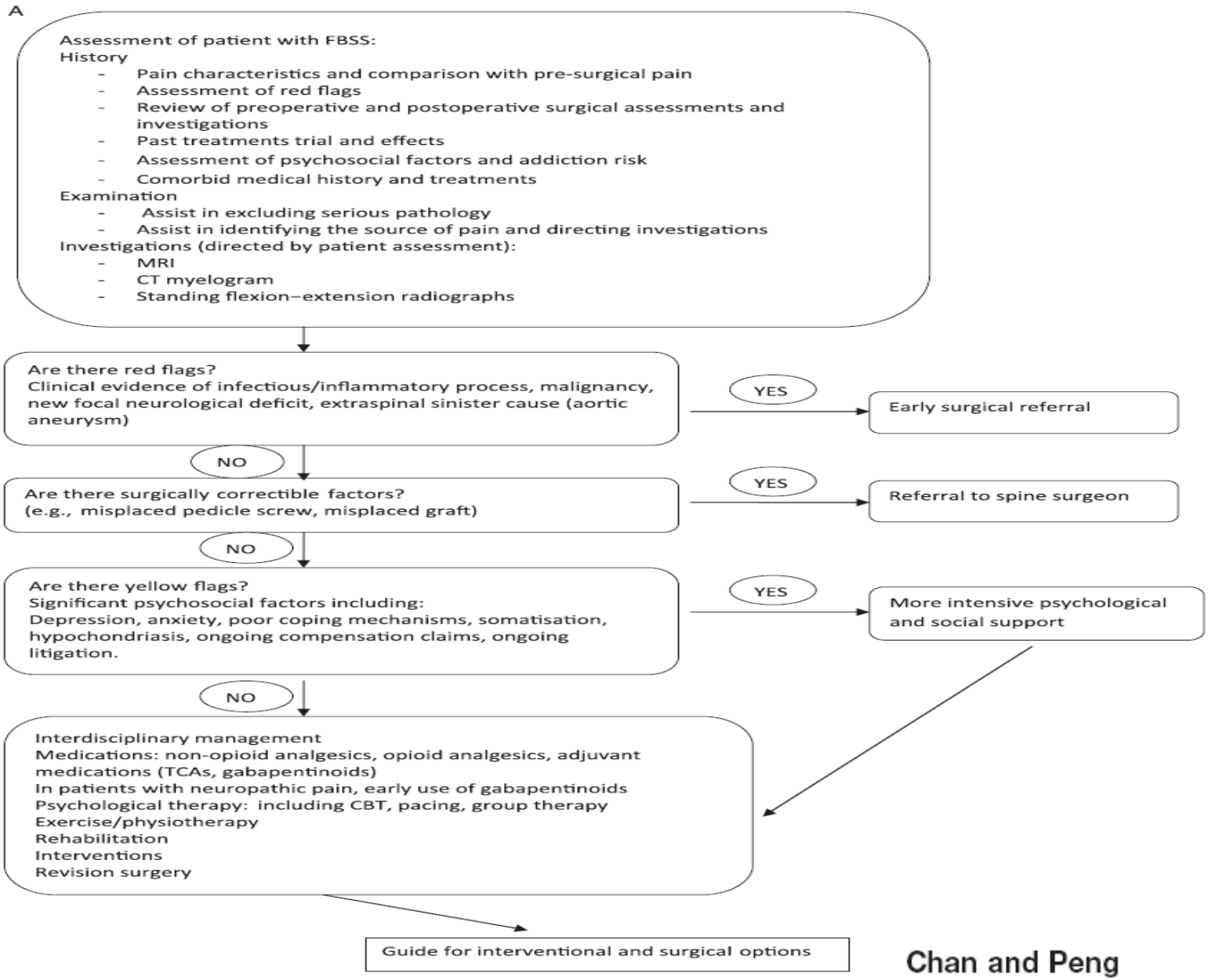
Tanı ?

Ayırıcı tanı?

Ne zaman ?

Nasıl?

Başarılı deneme dönemi?



Chan and Peng

Pain Medicine 2011; 12: 577–606
Wiley Periodicals, Inc.

Tanı/Ayırıcı tanı-FBSS

Primer organik lezyon(cerrahi öncesi+/cerrahi sonrası)

İkincil organik nedenler

Sekonder kazançlar

Psikolojik problemler-davranış bozuklukları

Fizik muayene (Waddel sign)

Radyodiagnostik/elektrofizyolojik testler

Tanısal bloklar

Ağrı tipleri- FBSS

Aksiyel/Nosiseptif

Mikst/

Nöropatik+nosiseptif

Radiküler/

Nöropatik

Uygun medikal,girişimsel tedavi yöntemlerini belirleme

Uygun implantasyon gereç,zamanlama,uygulama yöntemlerini belirleme…

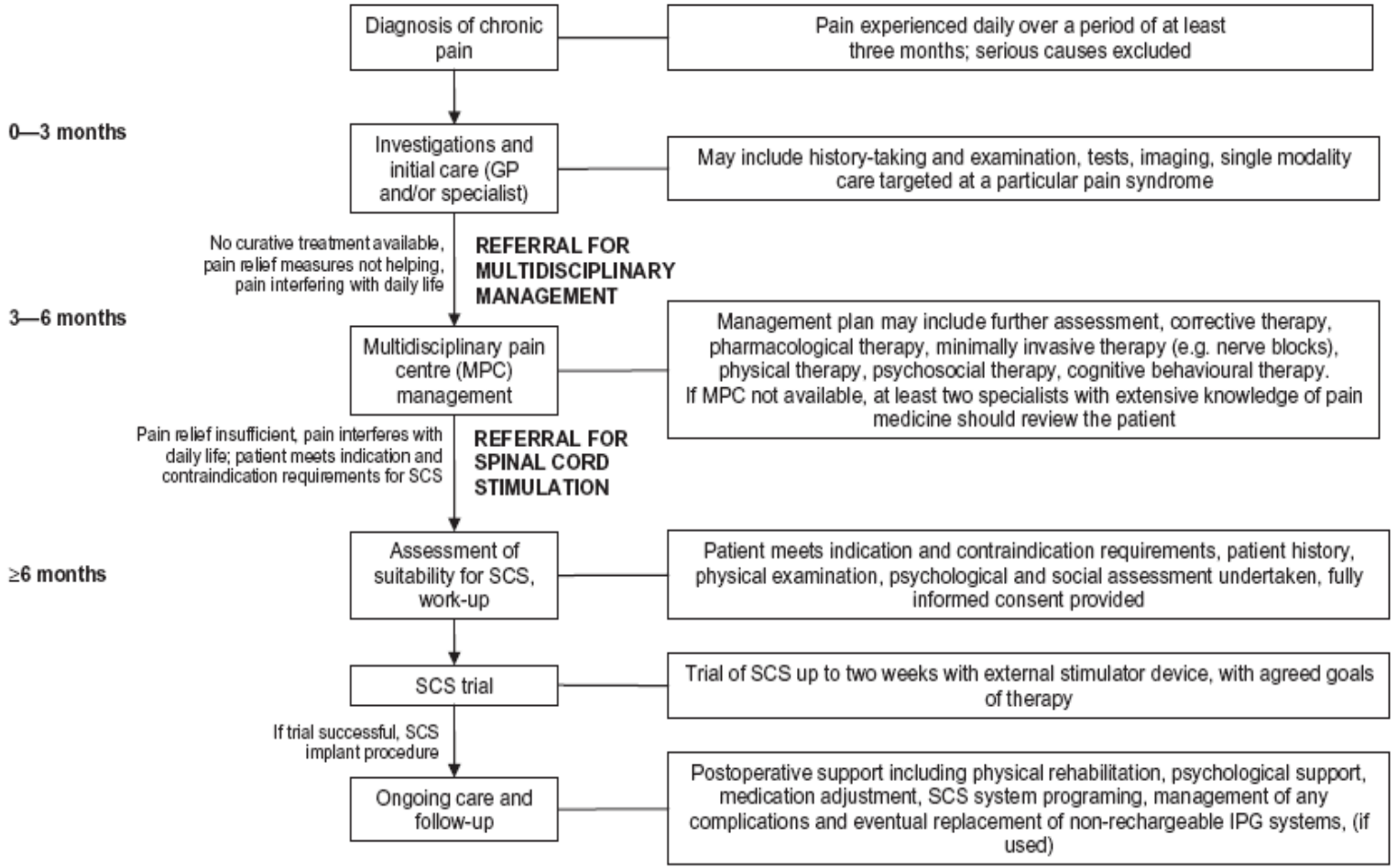


Fig. 1. Algorithm for referral of patients for spinal cord stimulation (SCS). GP = general practitioner, IPG = implanted pulse generator.

Recommendations for patient selection in spinal cord stimulation

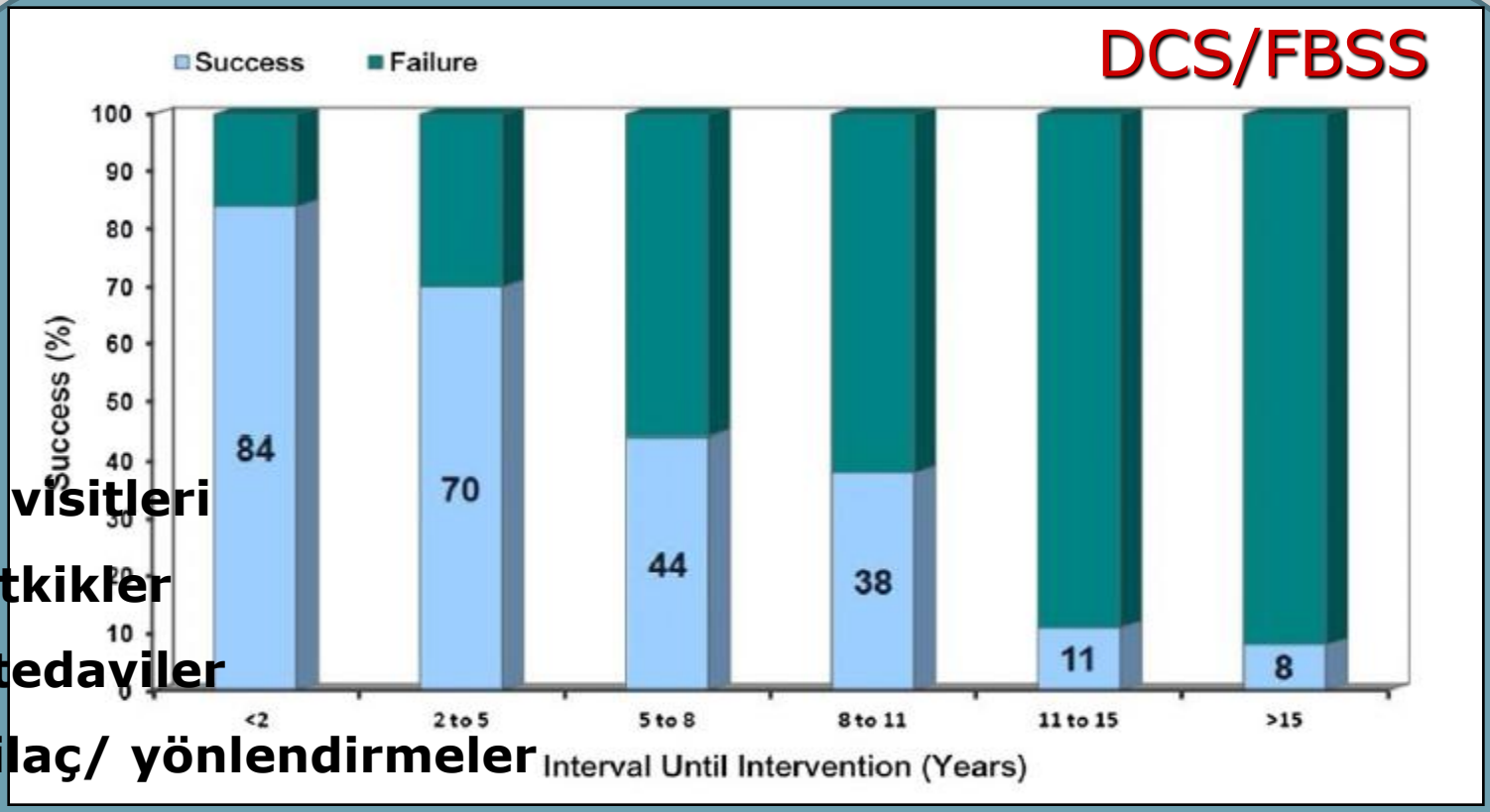
L. Atkinson [a,*], S.R. Sundaraj [b], C. Brooker [c], J. O'Callaghan [d], P. Teddy [e], J. Salmon [f], T. Semple [g], P.M. Majedi [h]

Journal of Clinical Neuroscience 18 (2011) 1295–1302

Ne zaman?-FBSS

!!!

DCS/FBSS



Doktor visitleri

Yeni tetkikler

Yanlış tedaviler

Yanlış ilaç/ yönlendirmeler

Tekrar-tekrar yanlış operasyonlar

Kumar K, Hunter G, Demeria D. Spinal cord stimulation in treatment of chronic benign pain: challenges in treatment planning and present status, a 22-year experience. *Neurosurgery* 2006;58:481–496.

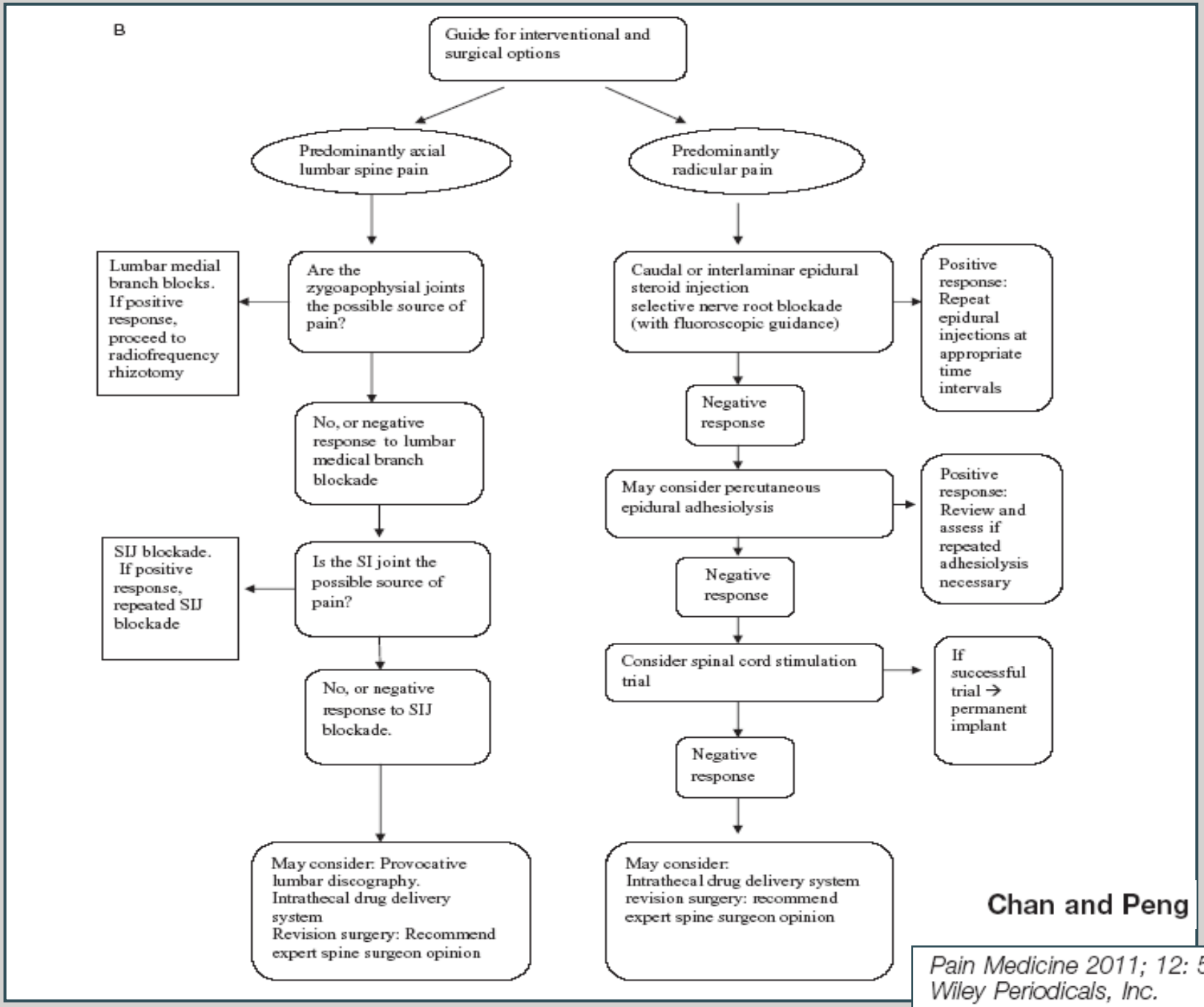
Ne zaman?-FBSS

EDITORIAL

Spinal cord stimulation for chronic pain: the importance of early referral

Pain Manag. (2014) 4(5), 329–331

amongst experts that patients presenting with neuropathic pain who do not respond to conventional treatments by 12 to 16 weeks should be offered a trial of SCS. We have demonstrated that efficacy of SCS treatment is time dependent with success rates exceeding 80% if implantation occurs within 2 years of symptom onset, compared with



Chan and Peng

Pain Medicine 2011; 12: 577–606
Wiley Periodicals, Inc.

an algorithm for FBSS using S.A.F.E.

- exercise
- over the counter analgesics
- complementary medical practice such as **acupuncture,**
- **chiropractic care, etc.**
- cognitive and behavioural therapies
- injection therapies such as **epidural steroids, epidural lysis of adhesions, facet joint injections, etc.**
- physical restoration therapies such as movement therapy, postural retraining
- membrane stabilization

obey KISS: use in series or parallel

↓ **persistent pain**

- reoperation
- chronic opioid maintenance
- spinal cord stimulation (SCS)/subcutaneous field stimulation
- intrathecal therapies

? which one

↓ **S.A.F.E. analysis**

- SCS/subcutaneous field stimulation
- chronic opioid maintenance
- intrathecal therapies
- reoperation

...s in patients with

...tory drugs (NSAIDs)
... inhibitors

...herapy
...ractor)

...nerve stimulation

...ucational
...ilitative therapy

Surgical
- Spinal cord stimul...
- Intrathecal drug de...
- Revision surgery

Using the SAFE Principles When Evaluating Electrical Stimulation Therapies for the Pain of Failed Back Surgery Syndrome

Elliot S. Krames, MD*, Sayed Monis, MD†, Lawrence Poree, MD, PhD‡, Timothy Deer, MD§¶, Robert Levy, MD, PhD**

Pain Medicine 2011; 12: 577–606
Wiley Periodicals, Inc.

Preoperatif risk değerlendirmesi-FBSS

Psikiatrik komorbiditelerin sorgulama formları ile sorgulanması

psikopatoloji

2.cil kazanç (emeklilik!!!)

cihaz taşıyabilirlik

İmmunsupresyon,diyabet,kronik dermatolojik hastalık,MRSA taraması,

The Appropriate Use of Neurostimulation: Avoidance and Treatment of Complications of Neurostimulation Therapies for the Treatment of Chronic Pain

Neuromodulation 2014; 17: 571–598

Preoperatif risk değerlendirmesi-FBSS

Review Article

Failed Back Surgery Syndrome

Chin-wern Chan, MBBS, BMedSci, FANZCA, FFPMANZCA,* and Philip Peng, MBBS, FRCPC†

Pain Medicine 2011; 12: 577–606
Wiley Periodicals, Inc.

Preoperative factors

- Patient
  - Psychological: anxiety, depression, poor coping strategies, hypochondriasis
  - Social: litigation, worker compensation
- Surgical
  - Revision surgery (50% increase in risk in spinal instability ≥4 revision)
  - Candidate selection (e.g., microdiscectomy for axial pain)
  - Surgery selection (e.g., inadequate decompression in multilevel pathology)

Using the SAFE Principles When Evaluating Electrical Stimulation Therapies for the Pain of Failed Back Surgery Syndrome

Elliot S. Krames, MD*, Sayed Monis, MD†, Lawrence Poree, MD, PhD‡, Timothy Deer, MD§¶, Robert Levy, MD, PhD**

Patients with significant psychosocial comorbidities such as active psychosis, unresolved psycho-emotional traumas, certain personality disorders, unresolved pain related litigation, untreated severe mood disorders, and serious untreated drug addictions, to name a few, may all be at increased risk of treatment failure with back surgery (63) or with implanted technology such as SCS (64). When Shealy first described the use of SCS for the treatment of persistent cancer pain, he recommended that appropriate patients be emotionally stable and have limited elevations in the Minnesota Multiphasic Personality Inventory (MMPI) depression scale (29).

bidities are not effectively addressed. Long et al. (65) reported that neuromodulation technology in patients that did not have appropriate psychosocial evaluation prior to treatment had a long-term success rate of only 33%. This percentage increased to 70% in

Neuromodulation 2011; 14: 299–311

The Impact of Psychological Factors on Outcomes for Spinal Cord Stimulation: An Analysis with Long-term Follow-up

Tilman Wolter, MD, Ingrid Fauler, MD, and Kristin Kieselbach, MD

Pain Physician 2013; 16:265-275•

60 →46 hasta/16FBSS

Pre imp.:Pain Disability Index (PDI)

Beck Depresyon Index (BDI)

NRS

NRS de ileri derecede anlamlı azalma

PDI değerlerinde ileri derecede anlamlı azalma

BDI II de anlamlı azalma yok

Başarılı Deneme Dönemi-FBSS

>%50 ağrı sağaltımı

VAS?

QoL?

İlaç kullanımında azalma

özl.opioidler

Yürüme mesafesi,uyku düzeni,işe geri dönme(ev hanımı?,futbolcu?)

Hastanın yorumu,yakınlarının yorumu,hekimin yorumu

- At least 50% patient reported pain relief.
- This pain relief persists in spite of appropriate provocative physical therapy.
- Analgesic consumption should remain stable or reduced during the trial period.
- The patient is satisfied both with the effects of SCS as well as the technical aspects of controlling and caring for the SCS implant.

North R, Shipley J, Prager J, et al. American Academy of Pain Medicine. Practice parameters for the use of spinal cord simulation in the treatment of chronic neuropathic pain. Pain Med 2007;8:S200–75.

Using the SAFE Principles When Evaluating Electrical Stimulation Therapies for the Pain of Failed Back Surgery Syndrome

Elliot S. Krames, MD*, Sayed Monis, MD†, Lawrence Poree, MD, PhD‡, Timothy Deer, MD§¶, Robert Levy, MD, PhD**

Neuromodulation 2011; 14: 299–311

MR

BT

Miyelo nöral terapi

Akapunktur

Enjeksiyonlar

Cerrahiler

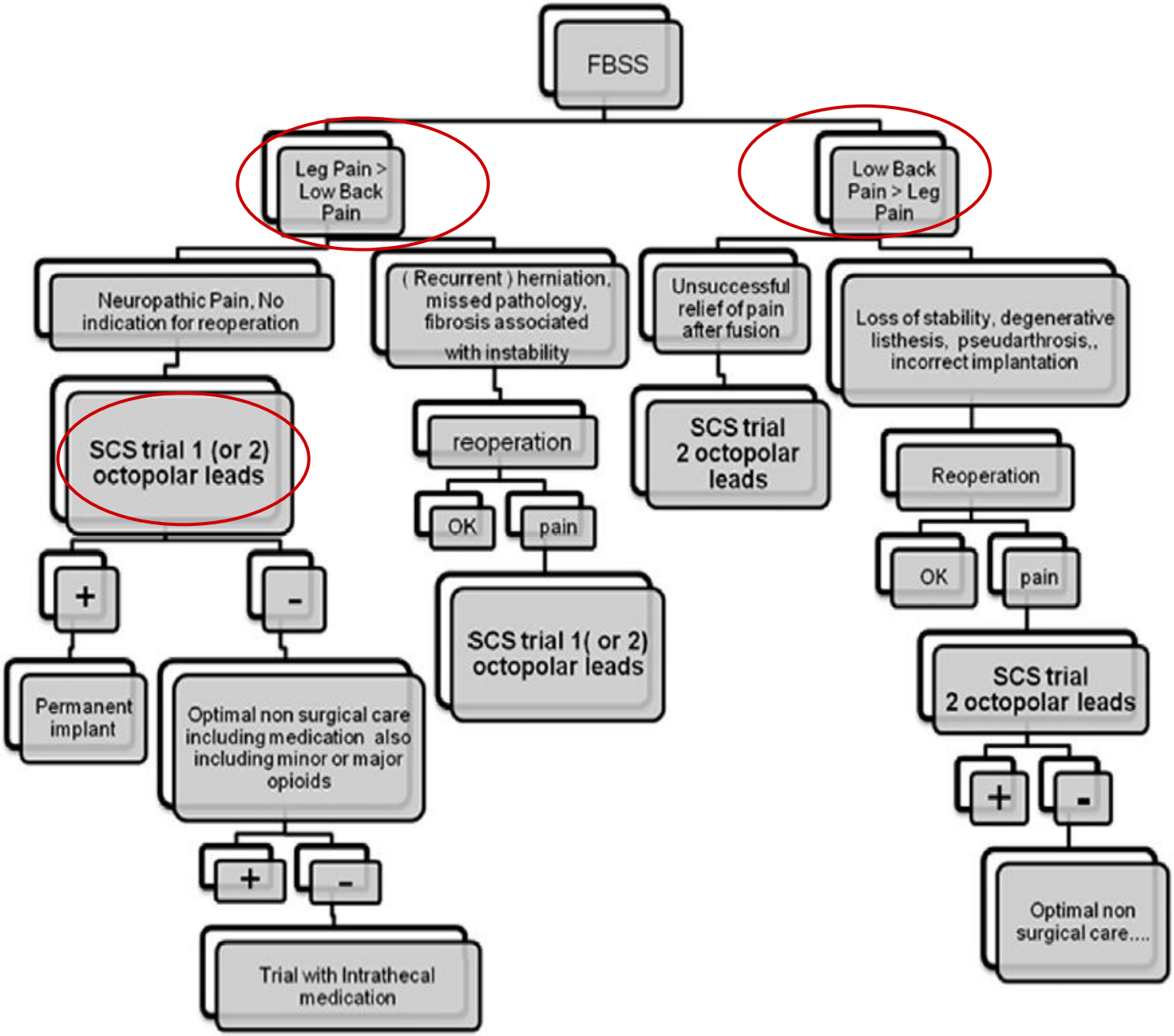
Opioidler

Adjuvanlar

NSAİDler

depresyon

maluliyet


FBSS
Leg Pain > Low Back Pain
Low Back Pain > Leg Pain
Neuropathic Pain, No indication for reoperation
(Recurrent) herniation, missed pathology, fibrosis associated with instability
Unsuccessful relief of pain after fusion
Loss of stability, degenerative listhesis, pseudarthrosis,, incorrect implantation
SCS trial 1 (or 2) octopolar leads
reoperation
SCS trial 2 octopolar leads
Reoperation
+
-
OK
pain
OK
pain
Permanent implant
Optimal non surgical care including medication also including minor or major opioids
SCS trial 1(or 2) octopolar leads
SCS trial 2 octopolar leads
+
-
+
-
Trial with Intrathecal medication
Optimal non surgical care....

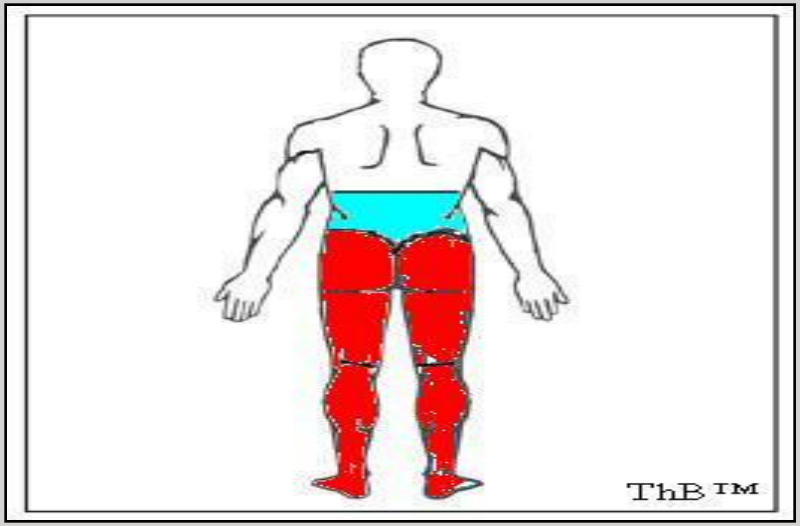
Predictors of Pain Relief Following Spinal Cord Stimulation in Chronic Back and Leg Pain and Failed Back Surgery Syndrome: A Systematic Review and Meta-Regression Analysis

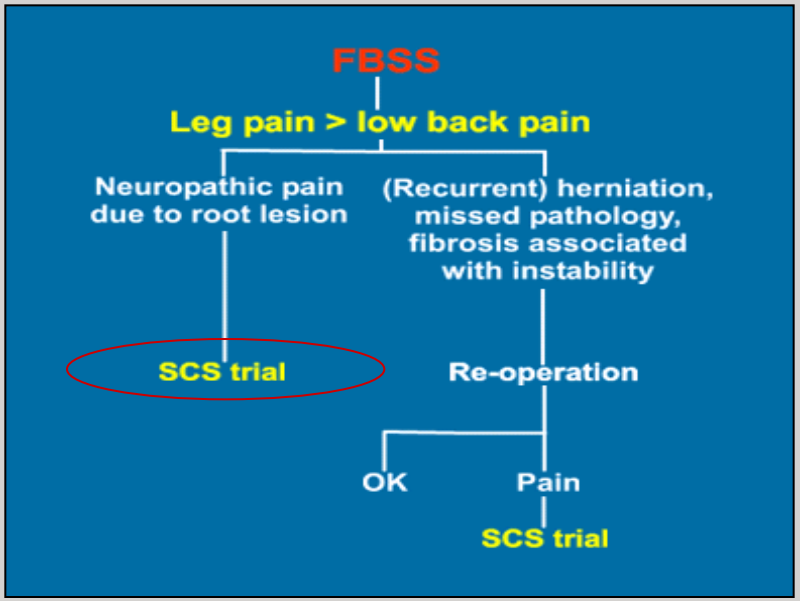
It is believed that SCS may be a more successful therapy for CBLP in those who present with pain predominantly in the legs than the low back.[12–14] While

Pain Practice, Volume 14, Issue 6, 2014 489–505

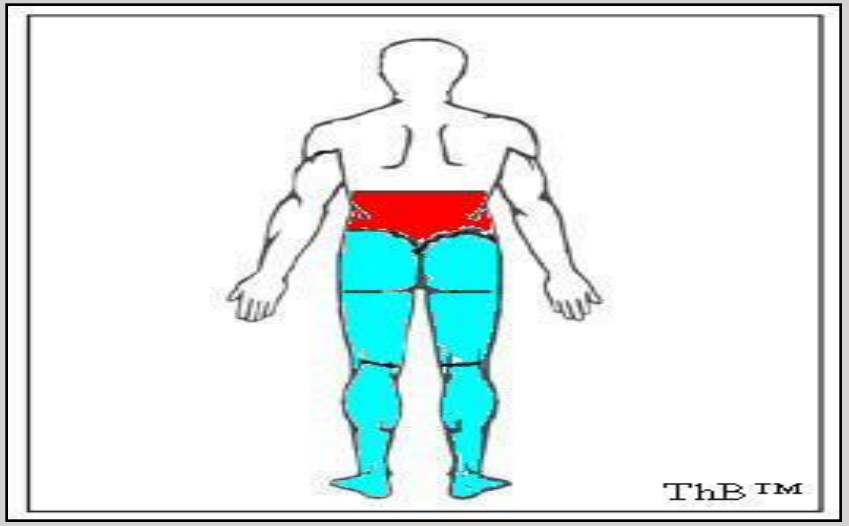
Tedavi algoritma- FBSS

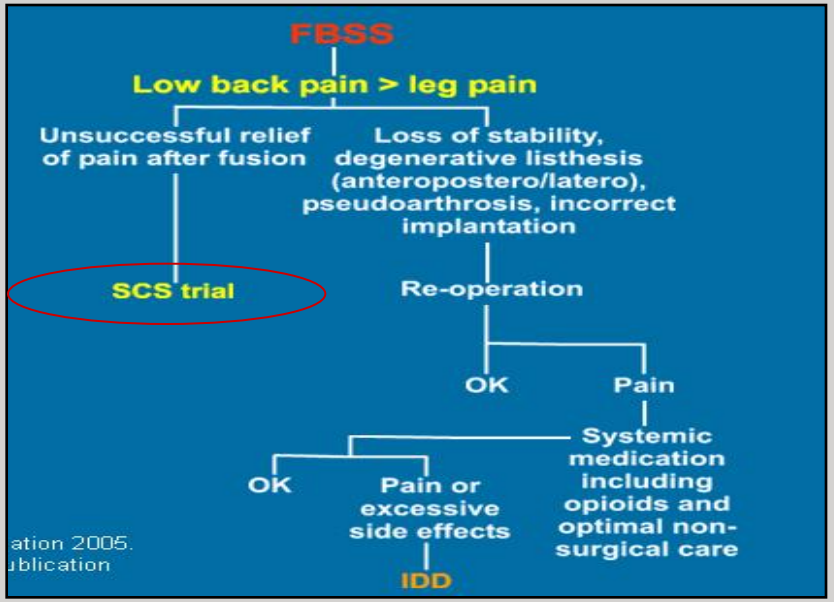
Bacak ağrısı > bel ağrısı





bel ağrısı > bacak ağrısı





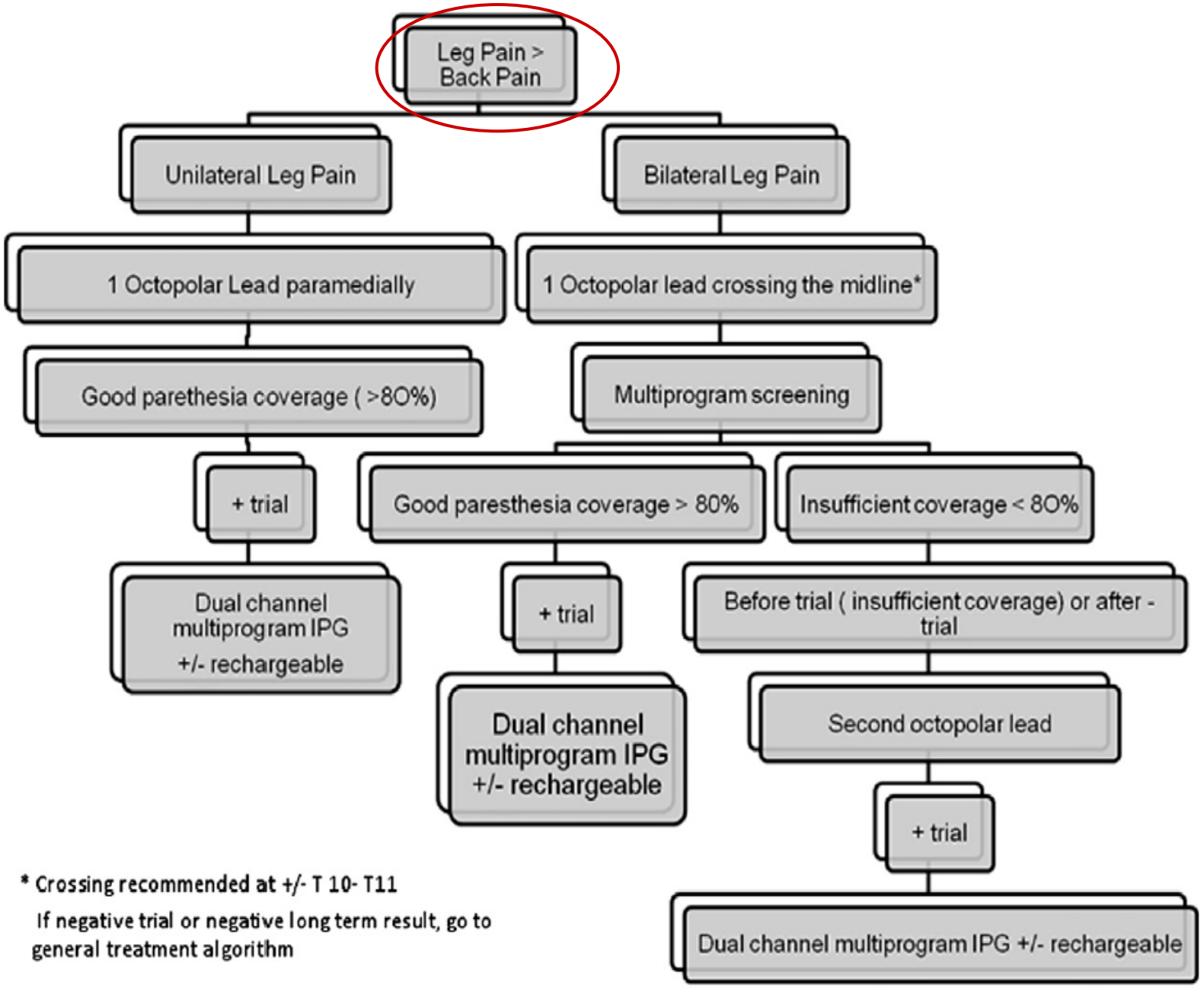

Leg Pain > Back Pain
Unilateral Leg Pain
Bilateral Leg Pain
1 Octopolar Lead paramedially
1 Octopolar lead crossing the midline*
Good parethesia coverage (>80%)
Multiprogram screening
+ trial
Good paresthesia coverage > 80%
Insufficient coverage < 80%
Dual channel multiprogram IPG +/- rechargeable
+ trial
Before trial (insufficient coverage) or after - trial
Dual channel multiprogram IPG +/- rechargeable
Second octopolar lead
+ trial
Dual channel multiprogram IPG +/- rechargeable
* Crossing recommended at +/- T 10- T11
If negative trial or negative long term result, go to general treatment algorithm

Table 1. Recommendations of the Neuromodulation Appropriateness Consensus Committee (NACC) of the International Neuromodulation Society (INS) to Mitigate the Risks of, Improve the Safety of, and Improve Outcomes of Neuromodulation Procedures.

1. The NACC recommends that implanters of neuromodulation devices be properly trained and credentialed by either an accredited interventional pain medicine training program or an accredited surgical training program.
2. The NACC recommends that implanters be specially trained in the community standards for the management of preoperative, intraoperative, and postoperative care of the patient undergoing surgical procedures.
3. The NACC recommends that, when possible, neuromodulation surgical procedures performed in operating room theaters be staffed by personnel specially trained in the understanding of the procedure and technologies used.
4. The NACC recommends that neuromodulation therapies be performed for neuropathic pain conditions prior to commencing long-term long-acting opioid maintenance.
5. The NACC recommends that patients being considered for neuromodulation procedures be treated in an interdisciplinary fashion with special attention paid to patients' pain reduction and emotional and functional restoration.
6. The NACC recommends the use of selection criteria for neuromodulation procedures be based on pain characteristics, including pain location and intensity.
7. The NACC recommends that a psychological evaluation by credentialed psychologists or psychiatrists be performed prior to a trial of neuromodulation therapies to select psychologically appropiate candidates for the procedure.
8. The NACC recommends that patients' wishes regarding cosmesis, choice of implant, and timing of surgery be considered as part of the preoperative and intraoperative planning.
9. The NACC recommends that prior to the day of trial or permanent implant, the implanter should fully explain to the patient the entire intended procedure, the risks attendant to the procedure, the benefits of the procedure, and the alternatives to the procedure, and receive consent to proceed with the procedure.
10. The NACC recommends that before trialing patients for neuromodulation procedures, the implanting physician discuss plans of the intended procedure with the patient's non-pain-treating physicians.
11. The NACC recommends the use of an appropriate preoperative assessment checklist and laboratory testing prior to either a trial or permanent implant.
12. The NACC recommends that before implanting a permanent device, a trial for tolerability and efficacy be performed.
13. The NACC recommends that prior to implanting an epidural lead, whether percutaneously or surgically, the patient should be evaluated for risks of anticoagulation and steps be taken to mitigate those risks appropriately before attempting placement of the lead.
14. When placing epidural and subcutaneous leads, the NACC recommends that the procedure be performed in an accredited sterile environment, such as a hospital surgical suite or ambulatory surgery center, using meticulous sterile techniques. If an office setting is used, the facility should meet the same standards as an accredited hospital facility.
15. The ideal anesthesia strategy enables real-time interaction between implanter and patient, thereby allowing the patient to describe the area and intensity of intraoperative paresthesia. If this is not possible, general anesthesia may be considered with somatosensory evoked potential monitoring.
16. The NACC recommends that all patients undergoing either a spinal cord stimulation trial or implantation of a permanent device should receive perioperative antibiotics less than one hour before incision.
17. The NACC recommends that the implanting physician be involved in the preoperative and postoperative care of the patient when possible.
18. The NACC recommends that programming of the neuromodulation device be performed by trained health-care professionals or device company representatives with appropriate patient monitoring and vigilance.
19. The NACC recommends that physicians who offer neuromodulation therapies within their scope of practice employ quality control and quality improvement through monitoring of outcomes, success indicators, and complications of their practice.

Table 5
Criteria for identifying patients suitable for consideration of spinal cord stimulation (SCS)

- Nöropatik ağrının tespiti
- Konservatif tedaviye yanıt alınamaması
- Psikojenik ko-morbiditeleri ekarte edilmesi
- İleri korektif cerrahi end. bulunmaması
- İmplantasyon kontrendikasyonunun bulunmaması
- İstekli hasta
- Doğru kurum

of pain complaint
• Clear diagnosis of neuropathic pain is evident, although accompanying
. FBSS with neuropathic pain in
limb(s), CRPS)
comprehensive conservative ther-
apy (that is, failed trials of physical and functional therapies, polyphar-
epressants and other drugs [such
as opioids] due to lack of efficacy or serious side effects)
al issues present
not indicated
drug or chemical substance dependence or abuse
No surgical contraindication to implantation
ssful trial screening for duration of up to 2 weeks. Too short a trial
may mislead success and too long adds potential complications
• Patient understands and is willing to participate in the therapy
• Implantation centre and hospital staff are educated, familiar and willing to participate as a team
• Spinal neural pathway to painful site distally must be preserved to experience pleasant paraesthesia with SCS

Recommendations for patient selection in spinal cord stimulation

L. Atkinson [a,*], S.R. Sundaraj [b], C. Brooker [c], J. O'Callaghan [d], P. Teddy [e], J. Salmon [f], T. Semple [g], P.M. Majedi [h]

Journal of Clinical Neuroscience 18 (2011) 1295–1302

Table 1
Multidisciplinary pain clinic and pain management service requirements[13] by the Australian Pain Society

- Designated space and adequate support staff
- Maintain patient records to allow assessment of individual patient outcomes and evaluate overall program effectiveness
- Round-table discussions of individual patients and the services provided
- Staff should include a suitably qualified director/coordinator, together with additional physician and non-physician healthcare providers who are appropriately qualified and able to assess and treat the medical, physical, psychosocial and vocational aspects of a wide variety of patients with painful conditions
  - Physicians may include neurosurgeons, medical specialists, psychiatrists, anesthetists
  - Other healthcare professionals may include registered nurses, occupational therapists, physiotherapists, psychologists, social workers, vocational counsellors

Recommendations for patient selection in spinal cord stimulation

L. Atkinson [a,*], S.R. Sundaraj [b], C. Brooker [c], J. O'Callaghan [d], P. Teddy [e], J. Salmon [f], T. Semple [g], P.M. Majedi [h]

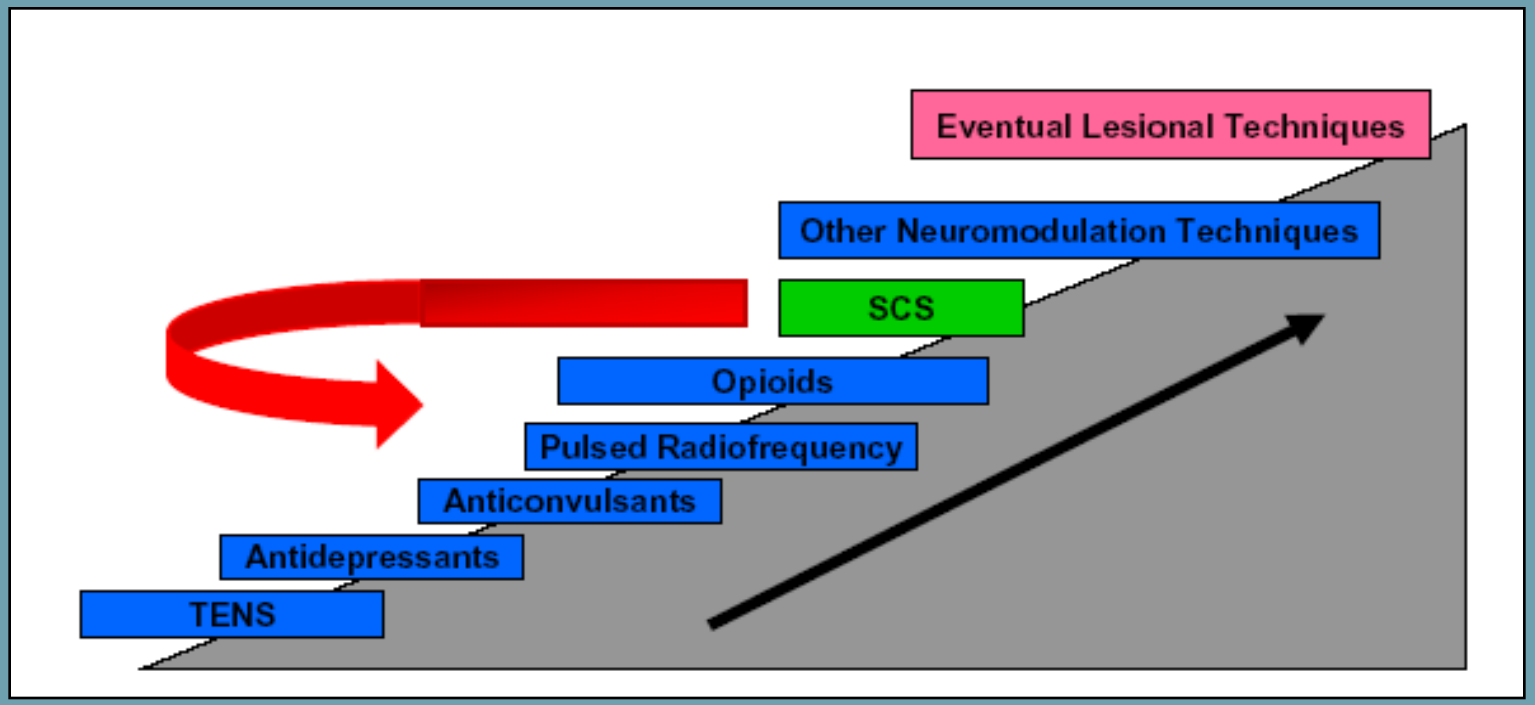
Journal of Clinical Neuroscience 18 (2011) 1295–1302

Bitirirken…….

FBSS

gktalu@yahoo.com

Tedavi-FBSS


Eventual Lesional Techniques
Other Neuromodulation Techniques
SCS
Opioids
Pulsed Radiofrequency
Anticonvulsants
Antidepressants
TENS

an algorithm for FBSS using S.A.F.E.

obey KISS:
use in series
or parallel

- exercise
- over the counter analgesics
- complementary medical practice such as **acupuncture,**
- **chiropractic care, etc.**
- cognitive and behavioural therapies
- injection therapies such as **epidural steroids, epidural lysis of adhesions, facet joint injections, etc.**
- physical restoration therapies such as movement therapy, postural retraining
- membrane stabilization

↓ **persistent pain**

- reoperation
- chronic opioid maintenance
- spinal cord stimulation (SCS)/subcutaneous field stimulation
- intrathecal therapies

? which one

↓ **S.A.F.E. analysis**

- SCS/subcutaneous field stimulation
- chronic opioid maintenance
- intrathecal therapies
- reoperation

Using the SAFE Principles When Evaluating Electrical Stimulation Therapies for the Pain of Failed Back Surgery Syndrome

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The Appropriate Use of Neurostimulation: Avoidance and Treatment of Complications of Neurostimulation Therapies for the Treatment of Chronic Pain

Neuromodulation 2014; 17: 571–598

Table 3. Procedure Checklist.

Preoperative medical issues
Check for evidence of active dermal, dental, or urologic infections and treat.
Order urinalysis before procedure.
Address prior history of infection and make a plan for prophylaxis.
Review MRI imaging of cervical, thoracic, or lumbar spine in past 12 months, depending on diagnosis and planned placement of stimulator tip.
Discontinue anticoagulation with approval of treating physician for a length of time prior to procedure that is appropriate for the specific anticoagulant and surgical bleeding risk. The appropriate timing for discontinuation should be based on the medication half-life and whether the patient is taking the medication for primary or secondary prevention. Off nonsteroidal anti-inflammatory drugs for 1 week if desired Off acetylsalicylic acid for 7 days Off warfarin or fondaparinux for 5 days, clopidogrel for 7 to 10 days, ticlopidine for 10 to 14 days
If patient was on warfarin, order prothrombin time testing for morning of the procedure.
Review psychological evaluation.
Obtain cardiac clearance in patients at risk for cardiac disease.
Review trial films and operative notes in preparation for permanent implant.
Evaluate the potential sites of implantation and battery pocket for infection or inflammatory process.
If there are any potential technical or patient-specific concerns, communicate with the treating physician and/or the anesthesiologist prior to implant.
Educate the patient/caregiver(s).
Obtain insurance coverage and document medical necessity.
Surgical considerations
Assess health status the day of surgery.
Have patient empty bladder preoperatively.
Obtain baseline pain score.
Review postoperative instruction sheet with patient/caregiver preoperatively.
Check that adult driver has been arranged to take patient home.
Order preoperative antibiotics and administer 30 to 60 min before incision or within 2 hours for vancomycin. Antibiotic doses should be based on the patient's weight.
Arrange for family to stay in postoperative area to observe programming and learn about recharging.
Confirm follow-up appointment before discharge.

Carragee et al. demonstrated that psychosocial risk factors were much more powerful in predicting low back pain disability than structural abnormalities [58]. Certain patients are at increased risk of developing FBSS [32]. A

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