

# Clinical Effectiveness Of “Transforaminal Epidural Block” by Subpedicular Approach In Lumbar Radiculopathy

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## **Abstract:**

**Introduction :**TFEB(Transforaminal Epidural Block) involves delivery of drugs through the epidural space and along the nerve root. This procedure can be both diagnostic (to know whether the given nerve root is the cause of pain) and therapeutic (to lessen pain by decreasing irritation around the nerve root) purposes . The subpedicular approach is a very commonly used procedure at present. This technique involves placement of the spinal needle in the secure triangle under the inferior exterior of the pedicle to reach the superolateral spinal nerve responsible for pain generation . Transforaminal area is the favoured location,as the drugs can be directly delivered into the anterior extradural space, i.e. area stuck between the back of the protruded disc and the anterior nerve root dural sleeve,thus reducing the risk of injury to dura mater . Transforaminal Epidural Block injections reduces the inflammation and stabilizes the nociceptive neural activity thus relieving the pain.

**Materials and methods :**We conducted a Prospective Cohort Study at IMS&SUM hospital,Bhubaneswar from March 2017 to December 2019.Our study includes 100 patients with lower back ache with radiculopathy due to disc herniation or lumbar canal stenosis managed conservatively for at least six weeks.All the patients have been diagnosed with transforaminal epidural block(TFEB). A complete clinical examination was done to rule out other causes of low backache with radiculopathy. Patient having predominant unilateral symptoms were given transforaminal block.

**Results .:** In our study 78 patients (78 %) had significant pain relief,which common in 48 patients(48%) till the go behind up period of more than 12 months,78 patients(78%)till the follow up period of 6months .The current study also provides evidence that, LTFEB provides significant respite of pain in majority of patients for three months following the block . Reduction in pain was assessed by restoration of activities of daily life without the need for other treatment modalities .48% of patients who were administered LTFEB had relief that persists for more than 12 months, without need for any other treatment.

**Conclusion :** From our study we conclude that, LTFEBs are reliable and cost effective procedures, without major adverse effects. Irrespective of become old, gender, stage of injection, symptom period and harshness of pain, TFEBs can provide significant relief of pain in majority of patients.

**Keywords :** TFEB,Lumbar,Radiculopathy,low back pain,effectiveness

## **1. INTRODUCTION:**

TFEB(Transforaminal Epidural Block) involves delivery of drugs through the epidural space and along the nerve root .This procedure can be both diagnostic (to know whether the

given nerve roots be the basis of pain) and therapeutic (to reduce pain by decreasing inflammation around the nerve root) purposes. Transforaminal Epidural Block injections reduce the inflammation and stabilize the nociceptive neural activity thus relieving the pain. DePalma and Narozny reviewed the effectiveness of transforaminal epidural steroid injection (TFESI) or SNRBs in the behavior of painful lumbar radicular symptoms [1,2]. The subpedicular approach is a very commonly used technique at present. This technique involves placement of the spinal needle in the safe triangle under the inferior outside of the pedicle to reach the superolateral spinal nerve responsible for pain generation. The transforaminal area is the favored location, as the drugs can be directly injected into the anterior extradural space, i.e. area between the back of the protruded disc and the anterior nerve root dural sleeve, thus reducing the jeopardy of injury to the dura mater [5,6,7]. The objective of the current study is to estimate the clinical effectiveness of TFEB for lumbar radiculopathy without neurodeficit and to evaluate Visual analog pain score, Rolland Morris disability score and Oswestry disability Index improvement on day 4.

## 2. MATERIALS AND METHODS :

We conducted a Prospective Cohort Study at IMS&SUM hospital, Bhubaneswar from August 2018 to December 2019. All Patients with low back ache and radiculopathy lasting > 6 weeks, MRI suggestive of intervertebral disc herniation with <50% canal stenosis, with radiculopathy and age group between 18 to 60 years were included in our study. Patients with >2 level lumbar disc disease, patients with bilateral involvement, multiple spinal nerve root involvement and neurological weakness, those with progressive neurological deficits, those with a huge herniation through harsh canal stenosis, those with Coagulation turmoil and those having a hereditary allergy to local anesthetics or corticosteroid were disqualified from our study. A comprehensive clinical history has been recorded in the proforma which includes the complaints of site, duration, intensity, diurnal variation, aggravation and relieving factors of pain. Severity, duration and degree of SLRT, restriction of activities of daily living, co-morbidity status and other risk factors were also recorded. A complete clinical examination was done to rule out additional causes of low back ache with radiculopathy. Patients having predominant unilateral symptoms were given TFEB and followed up for at least 6 months. None of the patients were missed at day 4 of follow up.

## 3. PROCEDURE :

After obtaining the informed consent, the patient was placed prone and parts preparation, dressing and drapping were done under sterile aseptic measures (fig-3) above and below the desired disc space. The fluoroscope was rotated in cephalocaudal direction to achieve parallel end plates in an AP view. The C-arm was rotated to 30-degrees at an oblique angle towards the ipsilateral side, to get the "Scotty dog" appearance. A 23-gauge, 3.5 inch, curved spinal needle is then inserted and advanced under fluoroscopy control by tunnel vision technique. Avoid the placement of needle medially while being passed through mid-pedicle in oblique view to reduce the risk of injury to the dura. Antero-posterior, lateral, oblique projections were taken to substantiate placement of the needle tip in the safe triangle or Kambin's triangle [8] (Fig 4,5,6). This technique tends to defend the epidural and nervous arrangement, and prevent chronic nerve edema as well as epidural bleeding [9,10]. The stylet was removed and 0.5 ml of Iopamidol was injected to confirm the epidural flow of the drug, following which 1 ml of triamcinolone (containing 40 mg) with 2 ml of 0.2%-0.375% ropivacaine were given. Post injection exercises were started immediately after injection in study groups only after pain relief and consist of abdominal strengthening exercises, lumbar paraspinal strengthening, hip flexibility and hamstring flexibility exercises.

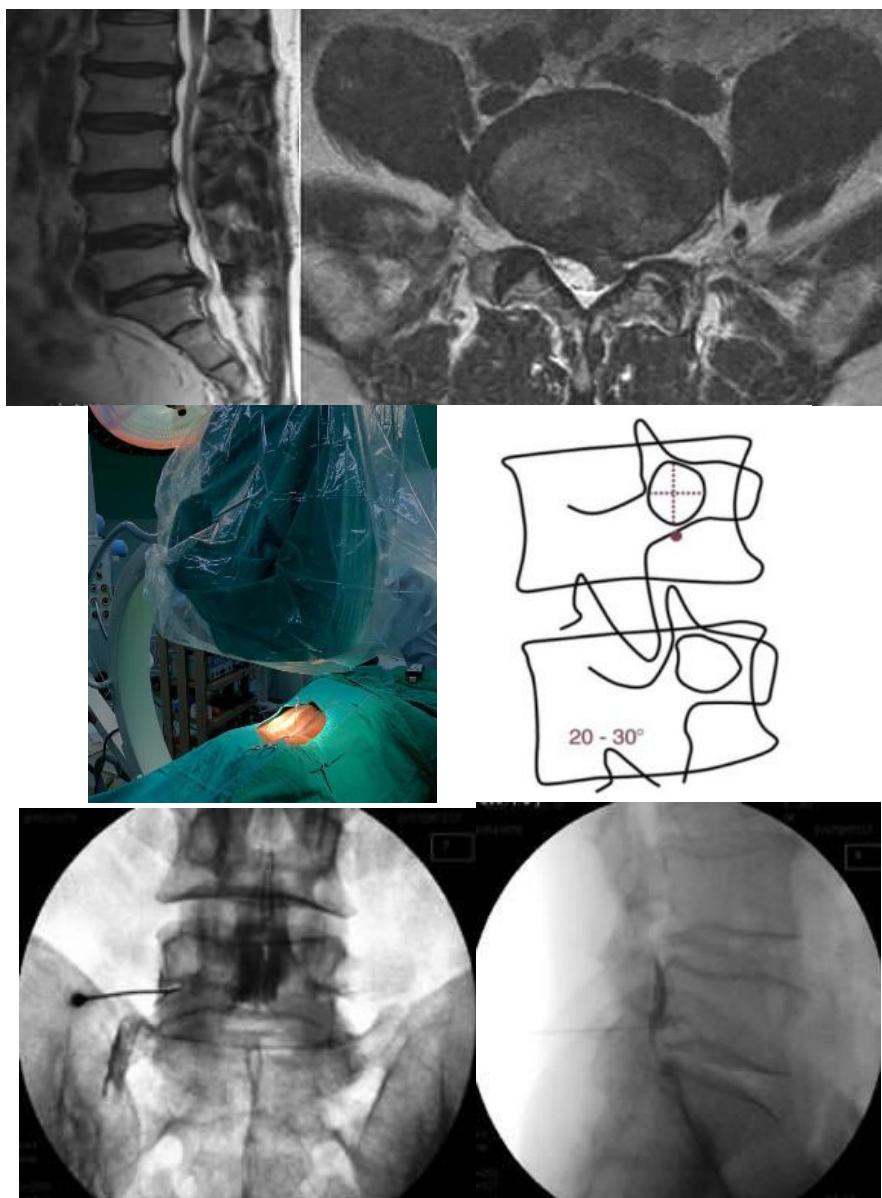


Fig 1,2- MRI showing PIVD at L5-S1 level. Fig 3 – Patient positioning. Fig 4 – Target point for TFEB. Fig 5,6- spreading of contrast agent .

Statistical Analysis : The evaluation was done post-injection at day 4 , 6 weeks , 3 and 6 months after therapy. Visual Analog Scale/visual analog numeric scale, Rolland Morris disability score, Oswestry disability index and SLRT was assessed for outcome.

1.agedistribution –

AGE GROUP (in years)	Age FREQUENCY
21-30	3
31-40	27
41-50	54
51-60	16

54 out of 100 patients belongs to 41-50 yr age group.

2.sexdistribution – In our study females were more commonly involved than males.Out of 100 patients 64 were females and 36 males.

3.grade of disc prolapse (msu grading) -

Grade of disc prolapse(msu grading)					
	Grade of disc prolapse(msu grading)	Frequency	Percentage(%)	Valid %	Cumulative %
Valid	MILD	66	66.0	66.0	66.0
	MODERATE	16	16.0	16.0	83.0
	SEVERE	18	18.0	18.0	100.0
	Total	100	100.0	100.0	

Out of 100 patients in our study 66% patients had mild, 16% patients had moderate and 18% patients had severe PIVD according to MSU grading of prolapsed disc based on MRI diagnosis of every patient.

4.side of radiculopathy -

		Frequency	Percentage(%)	Valid %	Cumulative %
Valid	LEFT	42	42.0	42.0	42.0
	RIGHT	58	58.0	58.0	100.0
	Total	100	100.0	100.0	

5 site of root block -

		Frequency	Percentage(%)	Valid %	Cumulative %
Valid	L4	12	12.0	12.0	12.0
	L4,L5	3	3.0	3.0	15.0
	L5	52	51.0	51.0	66.0
	L5,S1	6	6.0	6.0	72.0
	S1	27	28.0	28.0	100.0
	Total	100	100.0	100.0	

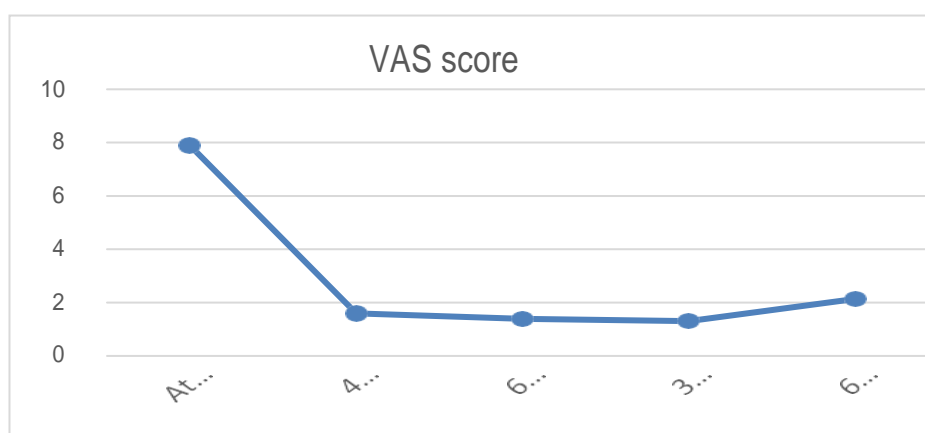
Out of 100 patients 52% had L5 root involvement,27% had S1 root involvement,3% had both L4,L5 roots involvement,6% had both L5&S1 roots involvement and 12% had L4 root involvement.

6.vas(visual analogue score) -

Score	VAS
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At presentation	Mean	7.89
	N	100
	Std. Deviation	0.79
	Median	8
At 4 days	Mean	1.59
	N	100
	Std. Deviation	0.83
	Median	2
At 6 weeks	Mean	1.39
	N	93
	Std. Deviation	0.944
	Median	1
At 3 months	Mean	1.3
	N	93
	Std. Deviation	0.988
	Median	1
At 6 months	Mean	2.13
	N	93
	Std. Deviation	0.851
	Median	2

In TFEB, pre practice mean of VAS be 7.89 and post method mean was condensed to 1.59 on 4<sup>th</sup> day ,1.39 by end of 6 weeks,was 1.3 by 3<sup>rd</sup> month and by 6 months it was 2.13. 50% mean reduction was noticed at 4<sup>th</sup> day. Out of 100 patients,excellent response were noted in

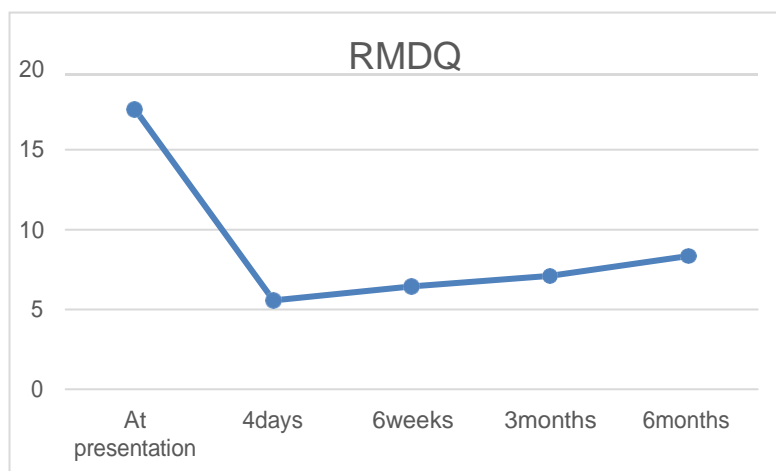


patients,very good response in 42 patients,good response in 8 patient.  
7.RMDQ(Roland Morris Disability mean score) -

Score		RMDQ
At presentation	Mean	17.54
	N	100
	Standard Deviation	2.101

	Median	18
At 4 days	Mean	5.57
	N	100
	Standard Deviation	3.543
	Median	4
At 6 weeks	Mean	6.44
	N	93
	Standard Deviation	3.748
	Median	5
At 3 months	Mean	7.1
	N	93
	Standard Deviation	3.909
	Median	6
At 6 months	Mean	8.34
	N	93
	Standard Deviation	4.338
	Median	7

Pre procedure mean score was 17.54 and post procedure it was reduced to 5.57 by 4<sup>th</sup> day , was 6.44 by 6 weeks, by 3<sup>rd</sup> month 7.1 and by end of 6 months it was 8.34. Improvement in score on 4<sup>th</sup> day post injection was 68.24 percent which is considered significant and successful.

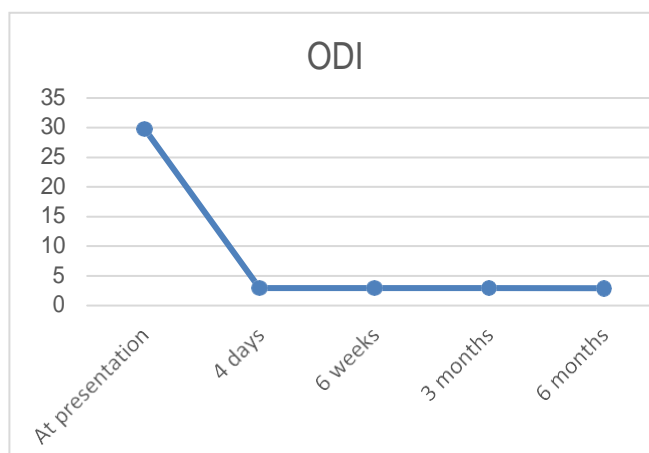


#### 8.ODI (Oswestry Disability index) -

Score	ODI	
<b>At presentation</b>	<b>Mean</b>	<b>29.83</b>
	<b>N</b>	<b>100</b>
	<b>Standard Deviation</b>	<b>3.178</b>
	<b>Median</b>	<b>28</b>
	<b>Mean</b>	<b>2.97</b>
	<b>N</b>	<b>100</b>

At 4 days	Standard Deviation	0.904
	Median	3
At 6 weeks	Mean	2.94
	N	93
	Standard Deviation	0.725
	Median	3
At 3 months	Mean	2.95
	N	93
	Standard Deviation	1.24
	Median	3
At 6 months	Mean	2.92
	N	93
	Standard Deviation	1.73
	Median	3

Pre procedure Oswestry Disability index mean score was 29.83 and post procedure it was reduced to 2.97 by 4<sup>th</sup> day immediately post injection, was 2.94 by 6 weeks, by 3<sup>rd</sup> month 2.95 and by end of 6 months it was 2.92. In score on 4<sup>th</sup> day post injection was 68.24 percent which is considered significant and successful.



#### 4. DISCUSSION:

In our study 78 patients (78 %) had *significant pain relief, which persist in 48 patients(48%) till the method period of 12 months*. Gahribo et al[11] in their learning in 2011 showed significant ache relief in 74.3% TFEB group with a follow up period of only 3 weeks. Our learning had comparable consequences of important pain release as 78% initially. Reduction in pain was assessed by restoration of daily pursuits without the need for other treatment modalities. This technique involves placement of the spinal needle in the safe part by subpedicular way to reach the spinal nerve responsible for pain generation. Transforaminal area is the favoured location, as the drugs can be directly injected into the anterior extradural space, i.e. area among the back of the protruded disc and the anterior nerve root dural sleeve,

thus reducing the risk of injury to dura[3,5,6,7].The mode of action of Transforaminal Epidural Block involves four mechanisms :1.)The antinociceptive properties of triamcinolone and ropivacaine.2.) triamcinolone and ropivacaine both act as membrane stabilisers.3.) The “washout” cause of the solution .4.)The anti-inflammatory properties of triamcinolone[4].Factors associated with the reduced duration of asymptomatic period following TFEB includes development spondylolisthesis, progression of disc herniation and symptoms lasting for more than 1 year. Short term response to Transforaminal Epidural Block(TFEB) may suggest a favorable surgical outcome. The demerits of current study includes,small sample size and short duration.

## 5.CONCLUSION :

From our study we conclude that, Tfebs are reliable and cost effective procedures, without major adverse effects. Irrespective of age, gender, stage of injection, indication duration and harshness of pain , Tfebs can provide significant relief of pain in majority of patients. Transforaminal epidural block therapy has been better result with reference to Roland Morris disability evaluation, Visual Analogue Score and Oswestry disability index.In patients with TFEB, disability improves significantly. Maximum improvement occurs within 4 days. In majority of the patients response lasts for 6month.

## BIBLIOGRAPHY:

- [1] Narozny M, Zanetti M, Boos N. Therapeutic efficacy of selective nerve root blocks in the treatment of lumbar radicular leg pain. *Swiss Med Wkly*.2001;131(5-6):75-80.
- [2] . DePalma MJ, Bhargava A, Slipman CW. A critical appraisal of the evidence for selective nerve root injection in the treatment of lumbosacral radiculopathy. *Arch*
- [3] .Bhatia A, Flamer D, Shah PS, Cohen SP. Transforaminal epidural steroids *Med Rehabil*. 2005;86(7):1477-1483
- [4] .Melzack R, Wall PD. Pain mechanisms: a new theory. *Science*.1965 Nov 19;150(3699):971-9.
- [5] . Slipman CW, Chow DW. Therapeutic spinal corticosteroid injections for the management of radiculopathies. *Phys Med Rehabil Clin N Am*.2002;13:697–711. [[PubMed](#)] [[Google Scholar](#)]
- [6] Manchikanti L, Cash KA, Pampati V, Damron KS, McManus CD. Evaluation of lumbar transforaminal epidural injections with needle placement and contrast flow patterns: a prospective, descriptive report. *Pain Physician*. 2004;7:217-223. [[PubMed](#)] [[Google Scholar](#)]
- [7] . Botwin KP, Gruber RD, Bouchlas CG, Torres-Ramos FM, Sanelli JT, Freeman ED, Slaten WK, Rao S. Fluoroscopically guided lumbar transforaminal epidural steroid injections in degenerative lumbar stenosis: an outcome study. *Am J Phys Med Rehabil*. 2002;81:898–905. [[PubMed](#)] [[Google Scholar](#)]
- [8] . Kambin P, Sampson S. Posterolateral percutaneous suction-excision of herniated lumbar intervertebral discs. Report of interim results. *Clin Orthop Relat Res*. 1986;207:37–43. [[PubMed](#)] [[Google Scholar](#)]
- [9] . Kambin P. Arthroscopic microdiscectomy. *Mt Sinai J Med*. 1991;58:159–164. [[PubMed](#)] [[Google Scholar](#)]
- [10] Kambin P, Savitz MH. Arthroscopic microdiscectomy: an alternative to open disc surgery. *Mt Sinai J Med*. 2000;67:283–287. [[PubMed](#)] [[Google Scholar](#)].
- [11] .Gharibo CG, Varlotta GP, Rhame EE, Liu EC, Bendo JA, Perloff MD. Interlaminar versus transforaminal epidural steroids for the treatment of subacute



lumbar radicular pain: A randomized, blinded, prospective outcome study. *Pain Physician* 2011; 14:499-511.



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