

## **UC Davis**

### **Anesthesiology and Pain Medicine**

#### **Title**

Radiofrequency Ablation of the Medical Branch Nerve as a Novel Treatment for Posterior Element Pain from Vertebral Compression Fractures: A retrospective Study

#### **Permalink**

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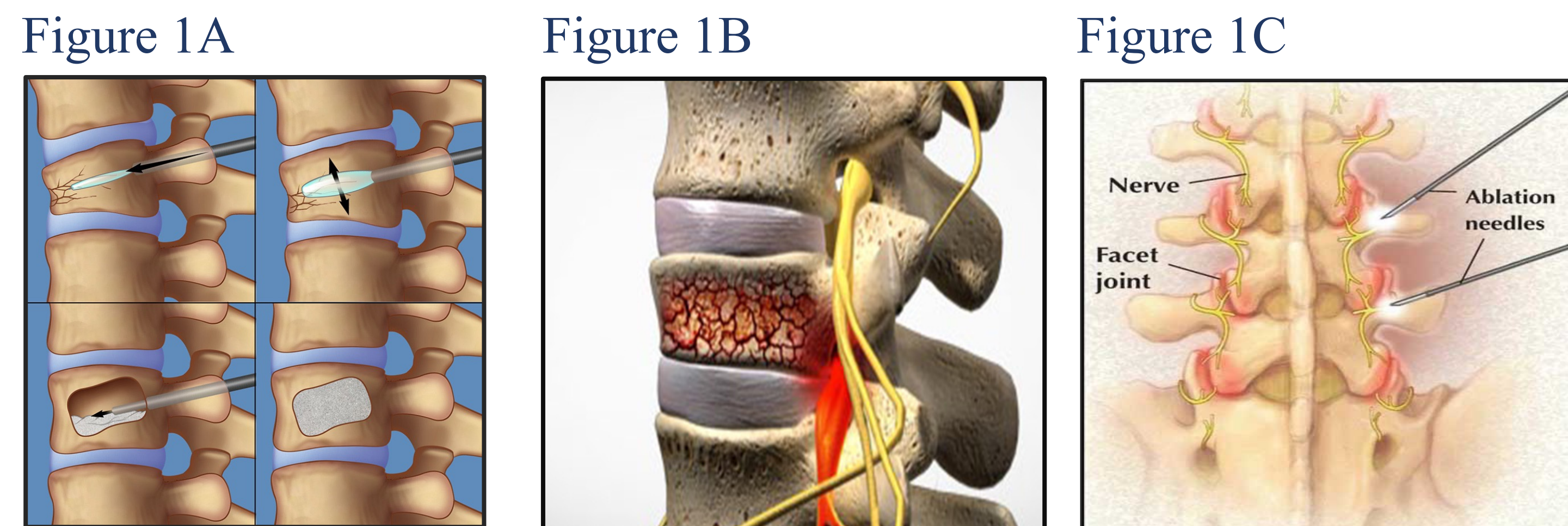
#### **Data Availability**

The data associated with this publication are not available for this reason: N/A



## Introduction

- Vertebral compression fractures (VCFs) from trauma, osteoporosis, or pathologic reasons are a significant cause of severe pain and decreased functionality, both of which pose a considerable functional and financial burden to the patient.
- Current therapies include kyphoplasty (Figure 1A), among various other short-term treatments. The efficacy of vertebroplasty have been questioned in recent years. In addition, this is an invasive procedure with notable traumatic complications.
- Previous studies have suggested that the posterior elements (Figure 1B) play a role in the pain caused by VCFs. Posterior element pain, which is often facet joint-mediated, can be relieved by intra-articular facet joint (IAF) injections or via medial branch nerve (MBN) blocks or medial branch nerve radiofrequency ablation (RFA-MBN) where the nerves supplying the facet joints are either anesthetized or ablated, respectively. Of these three options, RFA-MBN (Figure 1C) is a non-invasive safe procedure that can provide the most long-term pain relief and functionality improvement.
- While prior studies have shown the efficacy of pain relief with IAF injections and MBN blocks, no large studies have examined the efficacy of RFA-MBN in relieving pain associated VCFs. Thus, we believe it is important to understand whether RFA-MBN provides significant, sustained pain relief in patients with VCFs, as current treatment options are limited for this prevalent, painful condition.



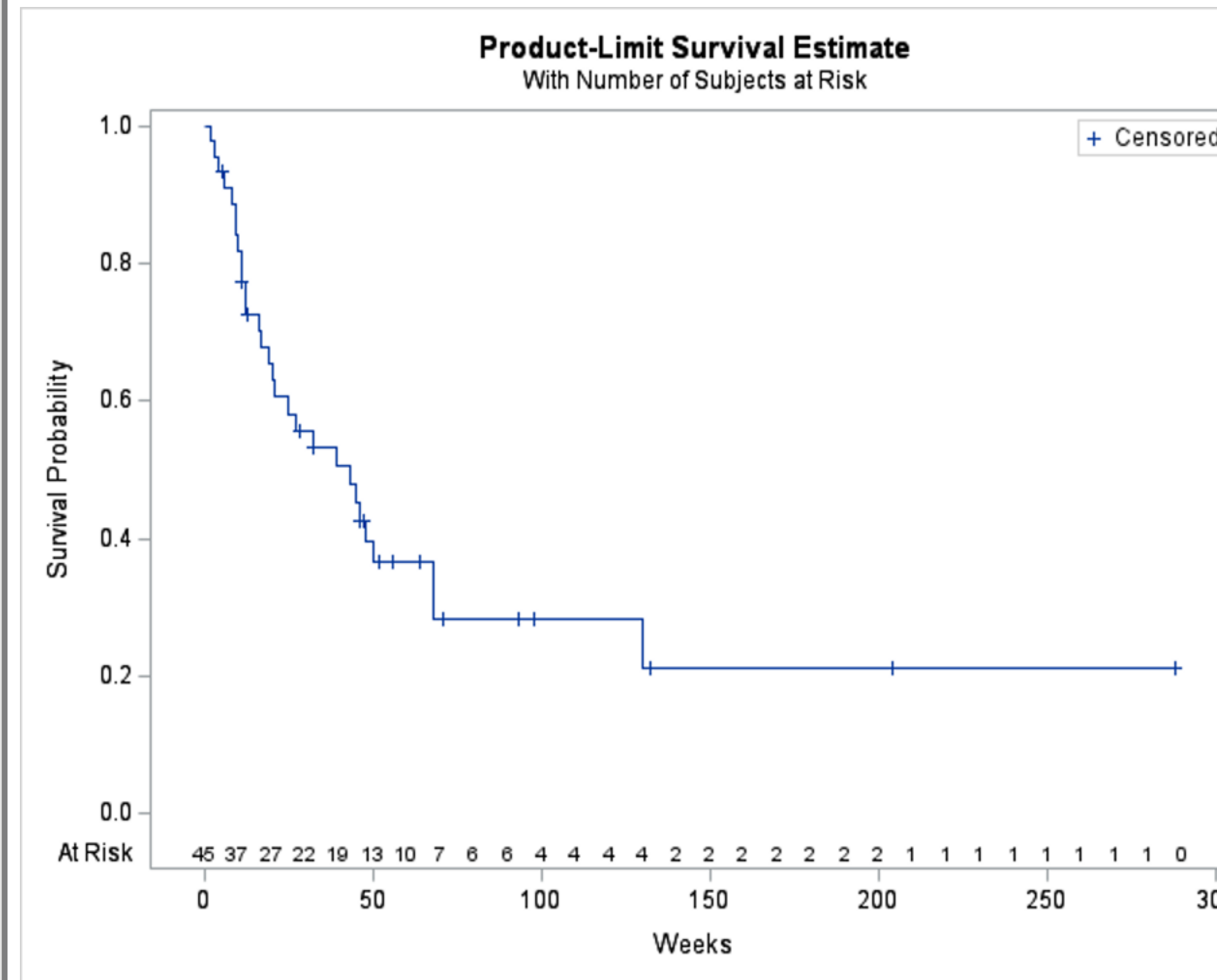
## Methods

- A 10-year retrospective study conducted at a single academic medical center of patients with VCFs that underwent RFA-MBN performed by 2 providers from August 2014 to June 2022 (n=53 patients). All patients that underwent RFA-MBN previously achieved greater than 80% pain relief with two diagnostic MBN blocks. Study went through the IRB process and achieved exempt status. Data was collected via EMR retrieval and chart review.
- The primary outcome measure was percentage in patient self-reported pain relief post RFA-MBN (Perc\_Relief1). The secondary outcome measure was long-term percentage in patient self-reported pain relief post RFA-MBN (Perc\_Relief2), pre-disability index (Pre\_DI), post\_DI, and difference DI (post\_DI minus pre\_DI). The primary covariates for the study included age, gender, number of VCFs, location of VCF, cause of VCF, PHQ9, prior vertebroplasty, and time to repeat ablation.
- Statistical Analysis was conducted using SAS software. All tests are tested two sided with 0.05 significance level.

## Results

Univariate Analysis between Perc_Relief1 and Interested Continuous Variables				
Variables	Description	N	Spearman Correlation (SC)	P.value
DI Difference	Post DI – Pre DI	32	-0.116	0.573*
Age	By years	52	-0.296	0.079*
PHQ9		32	0.222	0.321*
Univariate Analysis between Perc_Relief1 and Interested Categorical Variables				
Variables	Levels	N	Median (IQR)	P.value
Gender	Male	12	0.45 (0.6)	0.41^
	Female	41	0.50 (0.3)	
Number VCF	Single	30	0.58 (0.33)	0.21^
	Multiple	23	0.5 (0.5)	
VCF Location	Both	10	0.5 (0.45)	0.74^
	Lower Thoracic	11	0.5 (0.4)	
	Upper Lumbar	19	0.5 (0.4)	
Cause of VCF	Lower Lumbar	12	0.65 (0.4)	0.51^
	Osteoporosis	17	0.5 (0.3)	
	Trauma	16	0.7 (0.5)	
	CA	6	0.5 (0.3)	
History of Vertebroplasty	Osteopenia	4	0.5 (0.33)	0.71^
	Unknown	10	0.5 (0.7)	
	Yes	14	0.5 (0.3)	
	No	39	0.5 (0.5)	

TABLE 1: ANALYSIS BETWEEN PERCENT RELIEF AT TIME 1 POST RFA-MBN AND INTERESTED CONTINUOUS AND CATEGORICAL VARIABLES



PLOT 1: KAPLAN-MEIER PLOT AND LOG RANK TEST FOR TIME TO REPEAT RFA-MBN

	Perc_Relief1	Perc_Relief2	Length_Relief2 (weeks)
N (Missing)	36 (17)	15 (38)	14 (39)
Mean (SD)	0.55 (0.30)	0.48 (0.31)	34 (32)
Median	0.50	0.50	24

TABLE 2: PERCENT RELIEF AT TIMES 1 AND 2 POST RFA-MBN

## Discussion

- There is a notable clinically significant percentage of pain relief post RFA-MBN for patients with vertebral compression fracture with durable length of efficacy.
- This data corroborates the prior literature establishing that VCF-associated pain can be attributed to the posterior elements.
- There is lack of evidence to support a statistically significant difference between percentage of pain relief based on gender, number/location/cause of VCF and history of vertebroplasty. While not significant at a 95% confidence interval, there is a notable trend where increasing age is trending towards decreasing pain relief of statistical significance.
- At 50 weeks post RFA-MBN, 40% of patients had not required a repeat RFA-MBN (Plot 1).
- Limitations of the study: small sample size leading to low power for statistical analysis, large data variability, retrospective study based on chart review.
- Future directions: Increase sample size with addition of providers or prospective study.

## References

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