

An Overview

- Joined Mayo Clinic for placement, underwent comprehensive onboarding.
- Completed an online course on systematic reviews and meta-analyses.
- Developed three project ideas, one eliminated due to recent meta-analyses.
- Focused on primary project: vertebroplasty, a minimally invasive surgery.
- Proactively started creating an extraction sheet for data collection.
- Concluded study screening and data collection phase.
- Mentored by Dr. Karim Nathani, gained insights in R programming.
- Conducted analysis, generated impactful forest plots under mentor's guidance.
- Prepared presentation for project approval by Dr. Bydon.
- Project received approval.
- Currently working on drafting manuscript for potential inaugural publication.

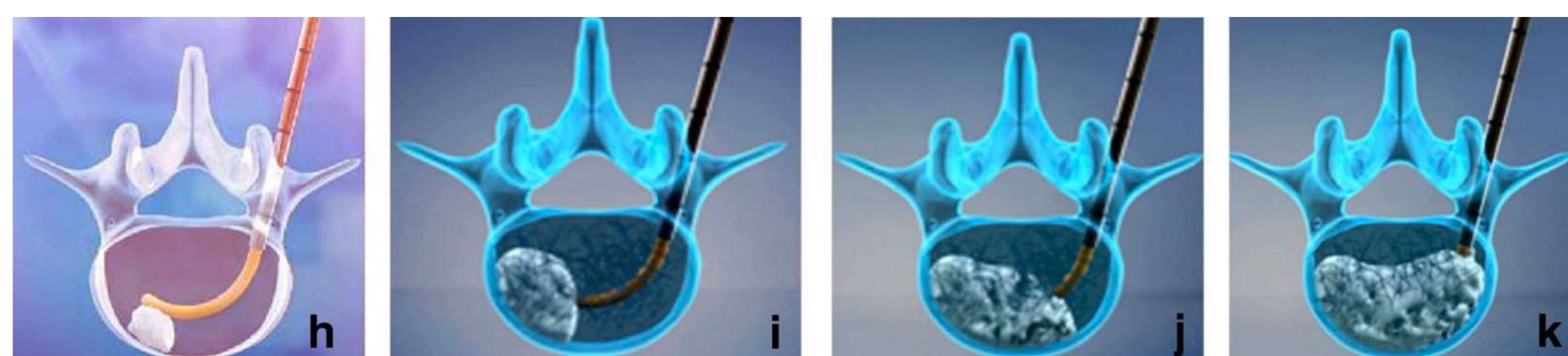


Figure 1. Illustration Demonstrating how PCVP Achieves Higher Injected Cement Volumes

Percutaneous Curved Vertebroplasty versus Unipedicular Vertebroplasty for Osteoporotic Vertebral Compression Fractures: A Systematic Review and Meta-Analysis

Objective: To evaluate the use of percutaneous curved vertebroplasty (PCVP) and unipedicular approach vertebroplasty (UVP) for the treatment of osteoporotic vertebral compression fractures (OVCFs) through a systematic review and meta-analysis of the available literature.

Methods: A systematic review of the scientific literature was conducted. Three randomized controlled trials and one retrospective study were included. Our outcomes of interest included injected cement volume, postoperative visual analog scale (VAS) scores, operative time, and cement leakage rate. Risk of bias tables were generated to determine the quality of each article.

Results: Four studies with 302 patients were included in the study. There were 142 (47.02%) patients in the PCVP group and 160 (52.98%) patients in the UVP group. PCVP was associated with significantly higher volumes of injected cement than UVP (MD: 1.20, CI: [0.27; 2.12], $p = 0.01$). Despite showing a strong trend in favor of PCVP, the meta-analysis did not report its superiority over UVP in terms of VAS (MD: -0.69, CI: [-1.66; 0.28], $p = 0.16$) and cement leakage rates (OR: 1.65, CI: [0.24; 1.75], $p = 0.26$), likely due to a few number of studies. Additionally, both the procedures had comparable mean operative times (MD: 0.20, CI: [-1.62; 2.03], $p = 0.83$), possibly due to overlapping procedure protocols.

Conclusions: PCVP reported a significantly higher volume of the injected cement compared to UVP for the management of OVCFs. While trends favoring PCVP in postoperative outcomes were observed, the limited number of studies warrants further investigation to establish the definitive superiority of either technique.

My Experience

My time with the team was incredibly enriching and an honor. The warm welcome and kindness I received from everyone meant a lot. Each interaction was a source of inspiration and knowledge. I have gained valuable insight and skills that will expand my horizons, encompassing both research abilities and interpersonal aptitude. The guidance from the lab members has profoundly influenced my growth, and I'm eager to apply these lessons to my ongoing projects. Dr. Bydon has fostered such an exceptional environment for personal and professional development. This summer has been amazing, and I am excited to continue learning and contributing positively to the lab.

Extra-Cirricular Activites

- Shadowed Dr. Bydon in clinic, gaining valuable patient interaction insights.
- Explored Mayo Clinic on a tour with fellow visiting students.
- Presented research paper at Journal Club, a weekly engaging event.
- Enjoyed a family trip to Disney World Orlando.

Study	Curved VP			Straight VP		
	N	Mean	SD	N	Mean	SD
Cheng et al. 2019	30	4.60	1.20	26	3.50	1.10
Li et al. 2020	36	5.50	0.35	42	3.20	0.38
Geng et al. 2021	25	3.54	0.35	40	3.46	0.33
Lv et al. 2023	51	5.50	1.40	52	4.20	1.00

Random effects model 142 160
 Heterogeneity: $I^2 = 99\%$ [99%; 99%], $p < 0.01$
 Test for overall effect: $z = 2.53$ ($p = 0.01$)

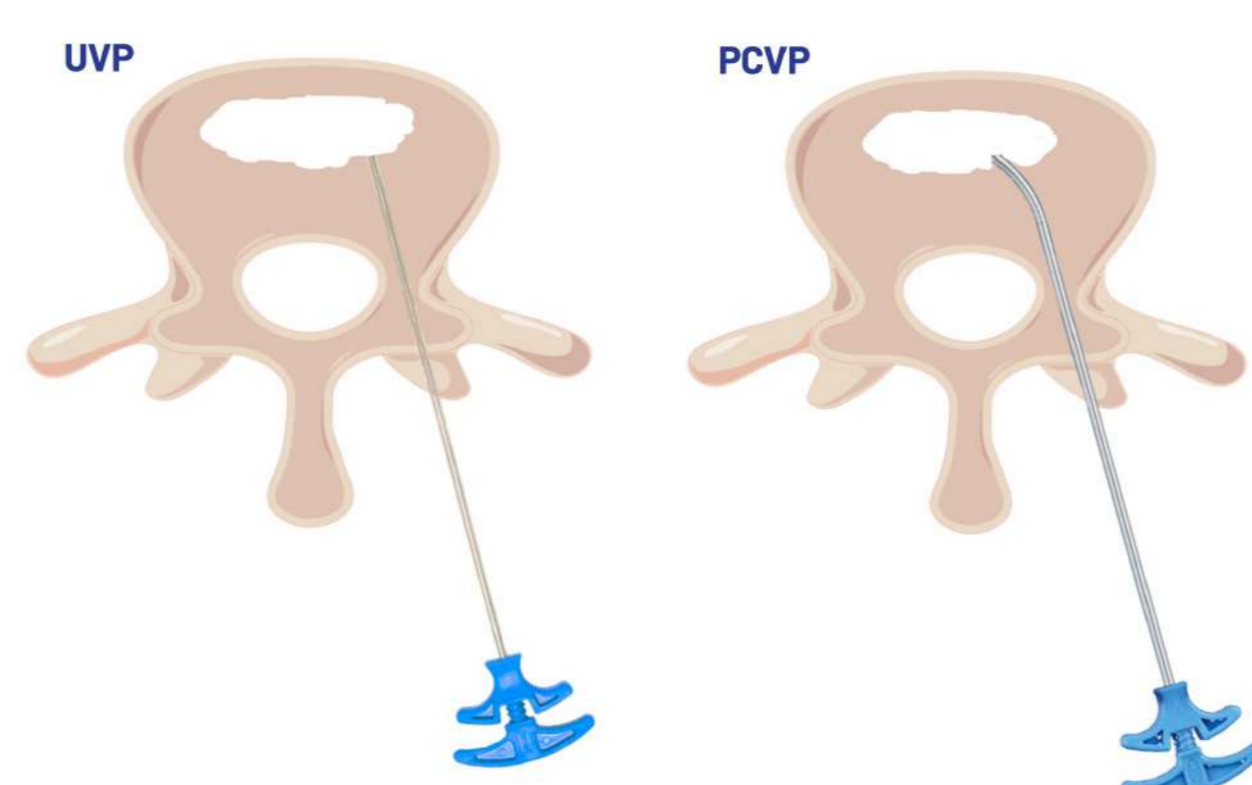
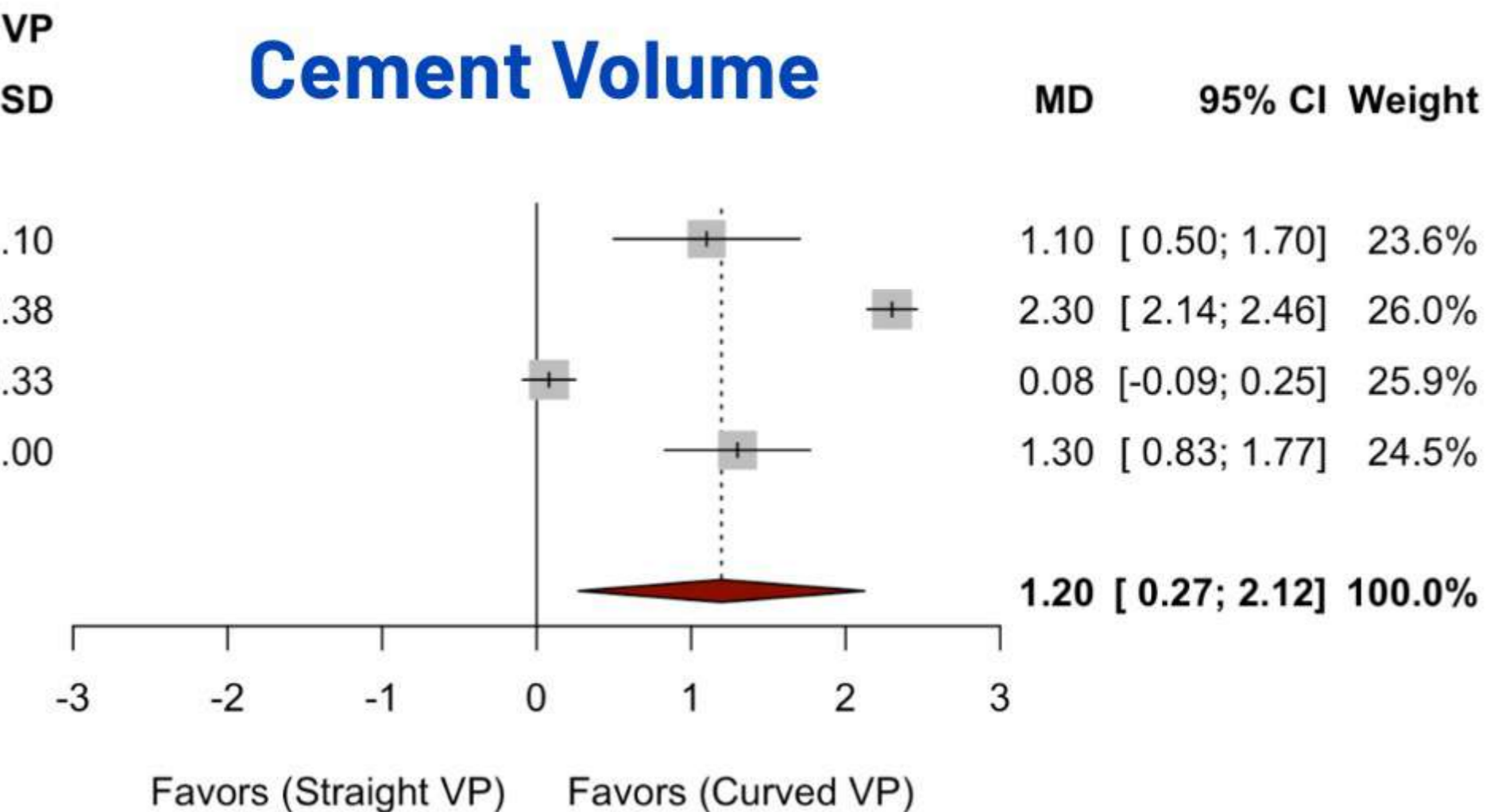


Figure 2. Illustration Comparing both Vertebroplasty Techniques

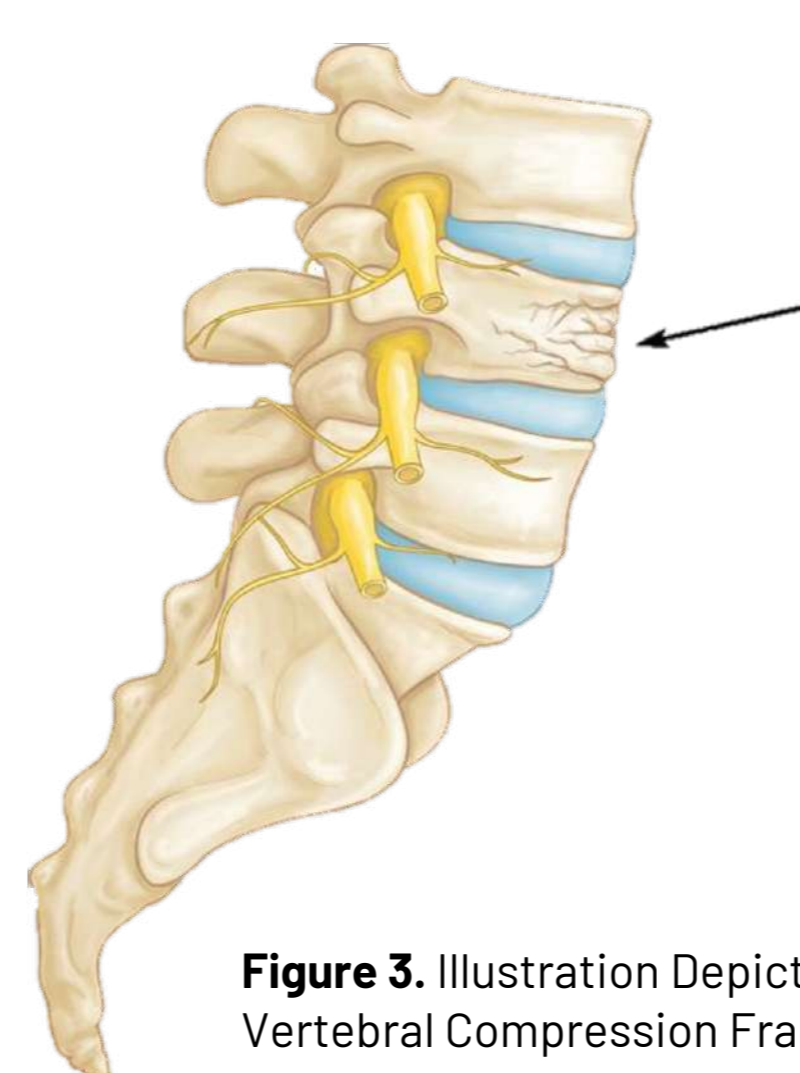


Figure 3. Illustration Depicting an Osteoporotic Vertebral Compression Fracture

Study	Curved VP			Straight VP			MD	95% CI	Weight
	N	Mean	SD	N	Mean	SD			
Cheng et al. 2019	30	1.20	0.50	26	1.60	0.30	-0.40	[-0.61; -0.19]	25.1%
Li et al. 2020	36	2.36	0.15	42	4.50	0.32	-2.14	[-2.25; -2.03]	25.3%
Geng et al. 2021	25	2.40	0.50	40	2.40	0.60	0.00	[-0.27; 0.27]	24.9%
Lv et al. 2023	51	2.06	0.87	52	2.27	0.86	-0.21	[-0.54; 0.12]	24.7%

Random effects model 142 160
 Heterogeneity: $I^2 = 99\%$ [99%; 99%], $p < 0.01$
 Test for overall effect: $z = -1.40$ ($p = 0.16$)

Study	Curved VP			Straight VP			MD	95% CI	Weight
	N	Mean	SD	N	Mean	SD			
Cheng et al. 2019	30	21.90	8.90	26	20.70	10.60	1.20	[-3.97; 6.37]	9.8%
Li et al. 2020	36	28.40	2.82	42	26.60	2.35	1.80	[0.64; 2.96]	37.6%
Geng et al. 2021	25	38.47	3.59	40	39.61	4.48	-1.14	[-3.12; 0.84]	29.2%
Lv et al. 2023	51	30.60	6.80	52	31.70	6.70	-1.10	[-3.71; 1.51]	23.3%

Random effects model 142 160
 Heterogeneity: $I^2 = 65\%$ [0%; 88%], $p = 0.04$
 Test for overall effect: $z = 0.22$ ($p = 0.83$)

Study	Curved VP		Straight VP		Odds Ratio	OR	95% CI	Weight
	Events	Total	Events	Total				
Cheng et al. 2019	3	34	9	30	0.23	0.05	0.93	20.3%
Li et al. 2020	5	36	6	42	0.97	0.27	3.48	23.6%
Geng et al. 2021	2	25	4	40	0.78	0.13	4.62	14.3%
Lv et al. 2023	20	51	23	52	0.81	0.37	1.78	41.8%

Total 30 146 42 164
 Heterogeneity: $I^2 = 0\%$ [0%; 85%], $p = 0.42$
 Test for overall effect: $t_3 = -1.39$ ($p = 0.26$)



My mentor Dr. Karim Nathani, and Dr. Asimina Dominari



Dr. Bydon & the team



First day at Mayo



Visiting students from all around the world