Which Spine Surgery Techniques Are Most Appealing to the Public? A Survey Examining Public Perception of Spine Surgery Techniques and Factors Associated With Procedure Preference

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INTRODUCTION: Patient-directed marketing is common as healthcare organizations and surgeons aim to grow spine surgery volume. While terms such as “robotic”, “endoscopic”, “minimally invasive”, and “disc replacement” are used in marketing materials, the understanding of these terms by the general public is unclear. Furthermore, the relative preference for these terms by the public is not well understood. This study therefore was designed to assess the public’s knowledge of spine surgery techniques, including traditional procedure descriptions (laminectomy and spinal fusion) and those commonly employed in marketing materials.

METHODS: Responses were collected using the online research platform Prolific. Survey was limited to English-speaking respondents in the United States. Demographic information (age, sex, education, region, income, insurance type), awareness of spine surgery techniques, understanding of these techniques, sources of information, perceived effectiveness, personal preferences, concerns about surgeries, and decision-making processes in selecting surgeons were recorded. Data were analyzed using Stata 18.0. After responses were tabulated, multivariate linear regression was used to determine independent association of patient demographic factors and preference for a specific surgical technique.

RESULTS: A total of 520 surveys were sent, with 493 complete responses (94.8%). Demographic data revealed a majority female participation (58.62%), and undergraduate degree was the most frequent level of education (39.96%). Awareness of surgical techniques such as spinal fusion (76.9%) and disc replacement (79.3%) were high and laminectomy (19.7%) and augmented-reality (10.9%) were low. Robotic spine surgery (76%) and Disc replacement (76%) surgery were felt to be the most effective techniques, and when asked which techniques they would choose for themselves, “minimally invasive” (72%) and “laser spine surgery” (61%) were the most popular choices. The most common concerns after spine surgery were complications (87%), surgery not working (78.7%), and recovery time (68.1%). Factors influencing surgical choices were gender, region, income, and education. Social media use was primarily YouTube (70.6%), Instagram (56.6%), and Facebook (51.9%). Recommendations from physicians and hospital reputations significantly impacted surgeon selection, emphasizing the importance of professional endorsements in surgical decisions.

DISCUSSION AND CONCLUSION: This study reveals substantial gaps in public awareness and understanding of advanced spine surgery techniques among members of the U.S. public, despite high rates of awareness of certain procedures like spinal fusion and disc replacement. Despite a lack of clear understanding, robotic spine surgery and disc replacement surgery were felt to be the most effective techniques, and “minimally invasive” and “laser spine surgery” were the most popular techniques. There was predominant concern for complications, efficacy, and recovery time, influencing surgical choices alongside demographic factors such as gender, region, income, and education. The role of social media, especially YouTube, Instagram, and Facebook, emerged as a significant channel for gathering information, while decisions on selecting surgeons were heavily influenced by professional recommendations and hospital reputations. These insights underscore the need for targeted educational initiatives to enhance public knowledge and align patient expectations with the advancements in spine surgery.

Q1: What is your age group?

- Under 25
- 25 – 30
- 31 – 40
- 41 – 50
- 51 – 60
- Over 60

Q2: What is your sex?

- Male
- Female
- Non-binary/other
- Prefer not to answer

Q3: What is your highest level of education?

- High School
- Associate degree
- College Degree
- Master's Degree
- Doctorate Degree

Q4: What region of the U.S are you from?

- West
- Midwest
- South
- Northeast

Q5: What is your annual household income?

- Less than $30,000
- $30,000 - $49,999
- $50,000 - $99,999
- $100,000 - $150,000
- Greater than $150,000

Q6: What type of health insurance do you have?

- Private insurance plan
- Medicare
- Medicaid
- No health insurance/ Out of pocket
- Other

Q7: Have you heard of the technique listed? (yes/no)

- Laser Spine Surgery
- Robotic Assisted Spine Surgery
- Disc Replacement Surgery
- Spinal Fusion
- Minimally Invasive Spine Surgery
- Endoscopic Spine Surgery
- Laminectomy
- Outpatient Spine Surgery
- Augmented Reality Assisted Spine Surgery

Q8. For each of the following spine surgery techniques, please indicate your level of understanding of the procedure. (Mr understanding, some understanding, clear understanding)

- Laser Spine Surgery
- Robotic Assisted Spine Surgery
- Disc Replacement Surgery
- Spinal Fusion
- Minimally Invasive Spine Surgery
- Endoscopic Spine Surgery
- Laminectomy
- Outpatient Spine Surgery
- Augmented Reality Assisted Spine Surgery

Q9. How did you first learn about the above spine surgery techniques? (Select all that apply)

- Television
- Online News
- Social Media
- Medical Professionals
- Friends or Family
- Never trusted about them
- Other (please specify)

Q10. Based on your knowledge or experience, please rate your perceived effectiveness of each spine surgery technique listed below? (1 = Not at all effective, 2 = Extremely effective)

- Laser Spine Surgery
- Robotic Assisted Spine Surgery
- Disc Replacement Surgery
- Spinal Fusion
- Minimally Invasive Spine Surgery
- Endoscopic Spine Surgery
- Laminectomy
- Outpatient Spine Surgery
- Augmented Reality Assisted Spine Surgery

Q11. If you were to consider spine surgery for yourself or a loved one, which of the following techniques would you be most interested in learning more about? Please rank them in order (most interested) to 10 (most interested).

- Laser Spine Surgery
- Robotic Assisted Spine Surgery
- Disc Replacement Surgery
- Spinal Fusion
- Minimally Invasive Spine Surgery
- Endoscopic Spine Surgery
- Laminectomy
- Outpatient Spine Surgery
- Augmented Reality Assisted Spine Surgery

Q12. If you or someone you love is considering spine surgery, what concerns, if any, do you have? (select all that apply)

- Fear of complication
- Cost of Surgery
- Cost and Insurance Coverage
- Fear of Pain
- Surgery not working
- Desire for alternative treatments
- Not having enough information to make a decision
- Need for another surgery
- Other

Q13. Where do you find information when selecting a surgeon? (Select all that apply)

- Ratings and Patient recommendations
- Doctor referral
- Own/internet search
- Social Media
- Advertisements (TV or Billboards)
- Other

Q14. How would you rate the below factors when choosing a surgeon?
1 = Not important, 5 = Most important

- Online reviews/comments
- Time spent with patient
- Hospital Reputation
- Recommendation of other physicians
- Recommendation of former patients
- Reputation of surgeon's training institution

Q15. What social media platform do you occasionally use? (~30 minutes a day)
Select all that apply

- Facebook
- Instagram
- Reddit
- TikTok
- Snapchat
- YouTube
- I don't use social media often

Table I Demographics

		No	%
Total		493	100
Age group			
	Under 30	148	30
	31 — 40	145	29.41
	41 — 50	86	17.44
	51 — 60	73	14.81
	Over 60	41	8.32
Sex			
	Male	194	39.35
	Female	289	58.62
	Non-binary/other	10	2
Education			
	High School	146	29.61
	Associate Degree	64	12.98
	College Degree	197	39.96
	Master's Degree	72	14.6
	Doctorate Degree	14	2.84
Region			
	West	163	33.06
	Midwest	92	18.66
	South	155	31.44
	Northeast	16.84	16.84
Income			
	Less than $30,000	107	21.7
	$30,000 - $49,999	88	17.85
	$50,000 - $99,999	162	32.86
	$100,000 - $150,000	16.63	16.63
	Greater than $150,000	54	10.95
Insurance			
	Private insurance plan	264	53.55
	Medicare	71	14.4
	Medicaid	88	17.85
	No health Insurance/ Self-pay	54	10.95
	Other	16	3.25

Table II Regression Analysis for Factors Associated with Procedure Preference

	Demographic Factor	r- value	P-value
Laser Spine Surgery	None		
Robotic Spine Surgery	Female sex	-0.9	<0.001
Disc Replacement	None		
Spinal Fusion	Female sex	-0.7	0.009
	Medicaid	0.8	0.049
Minimally Invasive	Female sex	0.7	0.005
	High school education	0.8	0.011
Endoscopic	Midwest	-0.8	0.037
	Northeast	-0.9	0.019
Laminectomy	Female sex	-0.7	0.005
Outpatient Spine Surgery	None		
Augmented-Reality	Female sex	-1.1	<0.001
	Income >100k	1.04	0.015
	High school education	-1.1	0.003