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Population-Based Survey of Lumbar Surgery Beliefs in the United States

Amanda Elyse McCauley
University of Nevada, Las Vegas

Zachery Clark Rasmussen
University of Nevada, Las Vegas

A POPULATION-BASED SURVEY OF LUMBAR SURGERY BELIEFS IN THE UNITED STATES

By

Amanda Elyse McCauley

Zachery Clark Rasmussen

A doctoral project submitted in partial fulfillment

of the requirements for the

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Amanda Elyse McCauley and Zachery Clark Rasmussen

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Jill Slaboda, Ph.D., Research Project Coordinator

Merrill Landers, Ph.D., Research Project Advisor

Merrill Landers, Ph.D., Chair, Department of Physical Therapy

Ronald Smith, Ph. D., Vice President for Research and Graduate Studies

and Dean of the Graduate College

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ABSTRACT

Purpose/Hypothesis: Studies have shown that poor lumbar surgery outcomes may be influenced by a person's preconceived perceptions of low back surgery (LBS). However, the perceptions of the general population about issues related to lumbar surgery are not known. Therefore, the purpose of this study was to investigate the general population's perceptions regarding LBS.

Number of Subjects: This study included 262 participants (Average age: 46.1, SD=16.9; 125 Males, 137 Females) who completed the questionnaire from the general population in the Las Vegas area.

Materials/Methods: Questionnaire development involved expert panel feedback from three physical therapists, three spine surgeons, two surgeon assistants/nurses, two researchers specializing in questionnaire design and two pain scientists. After revision and establishment of test-retest reliability, it was distributed at 12 grocery stores that were randomly selected from the Las Vegas area. The questionnaire consisted of demographic information, personal and family medical history, and 11 questions pertaining to perceptions of lumbar surgery.

Results: Of the surveyed population, approximately one third believed that lumbar surgery is successful to the point that they would be able to return to their previous level of activity. Over half of the respondents agreed that they would be afraid to undergo back surgery. In addition, more than half believe that side effects are common

and recovery from low back surgery is long. 76% of respondents agreed that they would try all other means of treatment before opting for lower back surgery, yet 39% said they would undergo back surgery if they had severe low back pain.

Conclusions: Our results show that the general population has a somewhat negative bias towards back surgery with the general view that LBS will result in a poor outcome, side effects, and protracted recovery. Most of the participants are afraid to have surgery and are not confident in returning to work or participating in previous physical activities. They are also not sure whether or not lower back surgery is successful. A large majority would first attempt recovery through alternate means like physical therapy, medication, etc.

Clinical Relevance: It is valuable to understand that the majority of people have a negative view on lumbar surgery. Patient education prior to surgery could be beneficial to their surgical outcomes, providing that patient expectations are approached realistically and individual variances are taken into account.

INTRODUCTION

Low back pain (LBP) is the most widely reported musculoskeletal disorder in the world, and it is reported that 70–80% of all people will develop LBP during their life.[1-3] Epidemiological data shows that the prevalence of LBP is not decreasing but is still at epidemic proportions and is an increasingly debilitating and costly problem.[3,4] With failed conservative care, worsening symptoms and increased disability, patients often consider spinal surgery to alleviate their pain and increase function.[5,6] Spinal surgery is very common in the US. The likelihood of having back surgery in the US is at least 40% higher than in any other country and over five times higher than the UK.[1,7,8] Therefore, the general population in the US is more likely to be confronted with spinal surgery, compared to other countries.

The success rate of lumbar surgery has become a widely debated topic.[1,9-11] A recent Cochrane review of lumbar disc surgery has shown that surgical interventions have between a 60 and 90% success rate.[1,6,7,12] This tells us that 10 – 40% of patients following lumbar disc surgery will have a poor outcome, with resulting pain, loss of movement and loss of function.[13] For instrumented lumbar spinal fusion, several studies indicate that the success rate (based on functional outcomes and pain measurement) is only 50%, thus indicating 50% of patients still reporting significant pain and disability following lumbar fusion.[14-16] Even newer technologies aimed at improving lumbar fusion outcomes, such as lumbar arthroplasty have shown failure rates around 20%.[17-19] Based on the current data on outcomes related to various forms of lumbar surgery, there are many patients that return to society with failed back surgery.

It has been shown that a person's preconceived perception of back surgery can affect the outcome of that person's surgery rehabilitation.[20] If these perceptions are negative, the person may catastrophize the situation, which has been shown to affect postoperative pain intensity and analgesic use.[21] Factors that may attribute to catastrophizing are gender, age, mood, depression and anxiety. It is important for health care professionals to take all of these factors into consideration when educating patients prior to surgery. This will ensure the best possible outcome.

After conducting an extensive literature search we are confident that no previous studies have been conducted to survey the general population regarding their beliefs related to lumbar surgery. Several studies have been conducted on the general population's beliefs regarding low back pain, but not lumbar surgery.[22-26] Research on outcomes of lumbar surgery indicates that some members of the public may view lumbar surgery as favorable, while others may not.[27] Studies have shown that patients undergoing spinal surgery tend to have unrealistic expectations (either expecting more or less recovery than is probable).[20,28,29] This can result in a poorer outcome. Since family members as well as their support community can influence patient's beliefs, it would seem important to develop a greater understanding of the general population's beliefs regarding surgery. Then we may be able to address concerns, correct misconceptions and properly educate back surgery patients. For this reason, we have strived to learn the general populations beliefs regarding back surgery through the use of survey methodology.

METHODS

Design

The purpose of this study was to discover the views and beliefs of the general public regarding lumbar surgery. Many components were integral to the design of this study: questionnaire development, data collection and data analysis. Questionnaire development involved expert panel feedback from three physical therapists, three spine surgeons, two surgeon assistants/nurses, two researchers specializing in questionnaire design and two pain scientists. Each had an extensive knowledge regarding low back pain and lumbar surgery. The panel was provided a checklist of questions concerning survey format, question clarity, the content validity and the construct validity of the questionnaire. A 70% agreement among experts for each item was considered satisfactory to proceed.

Next, a small pilot study was conducted to assess test-retest reliability. The initial form was distributed to a small sample of convenience and two weeks later the same sample responded to the survey again. Upon statistical analysis of the reliability a few questions were found to be problematic. These questions were re-worded or filtered out and the two-step testing process was repeated with a novel sample of convenience. Statistical analysis of the revised version found acceptable reliability with Intraclass Correlation (ICC) values ranging from .739 to .976. At that point, the questionnaire was ready for distribution.

Subjects

262 subjects (124 males and 136 females with two non-respondents) were recruited at local grocery stores. Subjects had to be 18 years or older (mean age: 46, SD 16.9). Subjects were approached at random and had to provide verbal consent prior to taking the survey. Those who completed the questionnaire were offered a refreshment or snack for their participation.

Locations

Grocery stores were selected as the best location to easily access a sample of convenience of the general public. Various grocery franchises were approached and permission to conduct research on their property was requested. Due to corporate policies, we were denied access to many stores and were only authorized by two main chains. The Las Vegas area, including North Las Vegas and Henderson, was divided into six sections corresponding to zip codes. A list of each stores' addresses was compiled. The list was then divided and each address was placed into a box corresponding to its predetermined zip code section. Two addresses were pulled from each box, resulting in five locations from one major chain and seven from the other.

Questionnaire

Demographic and family history

Demographic information was collected without obtaining any personal or identifiable information. Age, gender and state of residence were requested. There were also questions about race, ethnicity, work status, educational background and

income level. Race choices were: Caucasian, Asian, Native Hawaiian or Pacific Islander, Black or African American, Native American or Alaska Native, two or more races or some other race. Ethnicity options were Hispanic/Latino, Non-Hispanic/Non-Latino or other. Race and ethnicity categories were based on the 2010 US census.[30] Work status options were: employed full time, employed part-time, unemployed, disabled, retired or student. Educational background categories were: post-graduate (Masters, doctorate, etc.), graduate (Bachelors), Associates or some college or high school. The following ranges separated income levels: less than $10,000 per year, between $10,000 and $50,000 per year, between $50,000 and $100,000 per year, or more than $100,000 per year.

The following four questions pertain to personal and family history of low back pain and lumbar surgery. Options regarding personal history of back pain and surgery were provided with a sliding scale, from poor to excellent, regarding effectiveness of surgery, should that selection apply. The same options and scale were supplied in reference to a family member's history. Current back pain was assessed on a visual analog scale with zero being no pain and ten being excruciating pain. Additionally, previous orthopedic surgical history was queried with a sliding scale regarding the results.

Perceptions of back surgery

A 5-point Likert scale was used to gauge answers to the perception statements. The statements ask the respondent to mark: "totally agree," "agree," "neutral,"

"disagree," or "totally disagree." Refer to the appendix for the complete questionnaire. Statements 1-3 revolve around the perception of surgical success. Statements 4, 8 and 11 are concerned with surgery side effects, recovery and return to activity post surgery. Statements 5 and 6 correlate the perception of back pain to lumbar surgery. Statements 7 and 9 query fear regarding surgery. The 10th statement compares conservative treatment to surgical treatment.

Analysis

History of Back Pain and Perceptions

A one-way ANOVA was performed comparing the likert response to each level of back pain history (no history, occasional LBP, LBP requiring medical attention and lower back surgery). A significant difference was found in six different questions as represented in Table 1. Differences were further analyzed using a Tukey post hoc analysis. Each significant comparison ($p<.05$) is outlined in figure Table 2. The means presented correlate with the anchors of the Likert responses, 1 being totally agree, 3 being neutral and 5 being totally disagree.

RESULTS

Response Frequency

Data were entered into SPSS and a frequency distribution was created for each question. In questions primarily concerned with surgical success, statements 1-4, ~50% of respondents were 'neutral' while nearly 25% 'agreed' with each statement (Figure 1). When asked if they would undergo back surgery if they had severe low back pain, 32.4%

were 'neutral' while 30.9% agreed (Figure 2). In the question inquiring about fear of lower back surgery over 50% answered affirmatively (Figure 3). When queried about side effects the majority of subjects, 43.9%, were neutral while 38.2% believed them to be common. When asked if you can expect pain to be gone after surgery 40.5% were neutral while 31.7% disagreed. Over 70% of participants affirmed they would try any and all means of treatment before opting for lower back surgery (Figure 4).

In every case those that had lower back pain requiring medical attention were statistically different from another group. When asked if one was able to return to their prior level of activity after lumbar surgery, those with no history of back pain thought it more possible (mean=2.84) and those with back pain that required medical attention were more neutral (mean=3.23), p= .024.

When asked if you can expect pain to be gone following back surgery those with no history of back pain were more neutral (mean=3.08) compared to those with back pain requiring medical attention, who were more disagreeable of the statement (mean=3.52) p=.016.

Questions regarding fear of lower back surgery also showed differences between groups. Those with occasional back pain were neutral (mean=2.72) compared to those with back pain requiring medical attention (mean=2.08) who confirmed greater fear, p=.007. There was also a difference found between the respondents that required medical attention and the respondents that have had lower back surgery, p=.005 . Those with a surgical history were less fearful (mean=3.36).

When asked if side effects are common after lower back surgery, those with no history were more neutral (mean=2.61) compared to those with back pain requiring medical attention who were more agreeable (mean=2.24), p=.019.

In asking if one would be afraid of returning to work or to previous physical activities after lower back surgery, those with occasional back pain were neutral (mean=2.95) while those with back pain requiring medical attention were more on the agreeable end (mean=2.50), p=.034. Those with a history of lower back surgery were more disagreeable to the statement (mean=3.55) compared to the subjects requiring medical attention, p=.007.

When asked if all means of other treatment would be sought before lower back surgery, those with occasional back pain (mean=1.80) and those with back pain requiring medical attention (1.72) were agreeable compared to those who had lower back surgery, who were more neutral on the subject (mean=2.64), p=.022 and .012 respectively.

DISCUSSION

Our results indicate that there are certain belief trends for each question within the questionnaire, but there is still disagreement between participants. Analysis of lumbar surgery beliefs and participant demographics reveal little if any correlation. However, there were significant differences in lumbar surgery perceptions between those with differing lower back medical history.

Based on the results of perceptions of surgical success around 70% of the general population does not think of lower back surgery as successful. This may indicate that the majority of the population believes that there will be much effort and time to recover after surgery, whether or not full recovery occurs.

Fear tends to have a negative influence on outcomes, and it seems important that those 56% of people who are afraid to have back surgery should be educated on what the procedures entail. It could be very beneficial to that person's outcomes if they were not fearful of the procedures. A realistic, educated view on what was going to happen in surgery would provide the patient with peace of mind to continue with important post surgical activities like their home exercise program. This would help speed recovery and provide an overall improved outcome.

When the questions were compared to the participant's personal pain and medical history, some interesting correlations were found. There were statistically different responses in six different questions between those with different personal back pain histories. In every case those that had lower back pain requiring medical attention were statistically different from another group, and their responses were always more negative towards lumbar surgery. Based on this evidence, those that have had low back pain requiring medical attention think it less likely that people are able to return to their prior level of activity and that pain will be gone after surgery. They are also more afraid than other groups to have lower back surgery or to return to work after surgery. Furthermore, they are more likely to believe that side effects are common

after surgery, and they would be more likely to try any/all means of treatment before opting for lower back surgery.

We believe the reason that those with no history of back pain find it more likely to return to their prior level of activity after surgery, that pain will be gone, and that side effects are less common could simply be that they have never experienced the debilitating nature of back pain. Those that have needed medical attention know that it can interfere with your daily activities and that the pain is a constant nuisance. They might be less able to imagine a world without back pain.

Those who required medical attention were statistically different than both those with occasional back pain and those who have had back surgery. Those that have had back surgery previously were the least afraid to have back surgery and to return to work/previous physical activities. Those that have had medical attention were the most afraid of both. This shows that somebody who has already experienced surgery is less likely to be afraid to have it again or return to work after. The reason those who have had medical attention were more afraid than those with occasional back pain could be the fact that they are closer to requiring surgery, and they might be more anxious about that possibility.

Another significant difference was found when asking if you would try all/any means of treatments (physical therapy/medications) before opting for lower back surgery. In this case, those who have previously had lumbar surgery were statistically different than those with occasional back pain and those who have required medical

attention. In both cases those with previous lumbar surgery were more likely to not try all means of treatment before surgery. This indicates that they are more willing to trust the surgery to help them get better over those that have had occasional back pain or those that have required medical attention.

CONCLUSIONS

Our results express a fairly negative prejudice towards back surgery. The general population believes LBS will result in a poor outcome, harmful side effects, and a prolonged recovery. Furthermore, our results demonstrate that the majority of people are confident in different means of treatment prior to surgery. The bulk of research participants were uneasy to undergo surgery and would be scared to return to their occupation or participate in previous physical activities. They are also not convinced if lumbar surgery is successful or not. Many would opt first for conservative treatments such as physical therapy, medication, etc.

It is important to understand that most people think negatively when contemplating lumbar surgery. In order to ensure positive surgical outcomes, it is necessary to provide patient education that will help them to become an informed participant in this process. Properly informing the patient of all possible outcomes, including their individual variances and comorbidities, will allow the patient to have realistic expectations.

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TABLES AND FIGURES

Figure 1

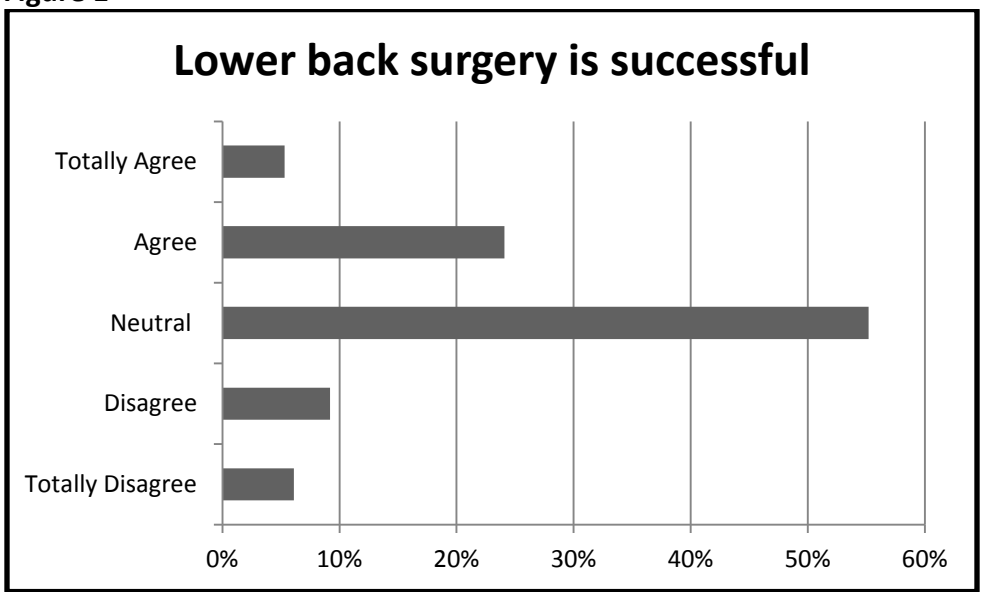


Figure 2

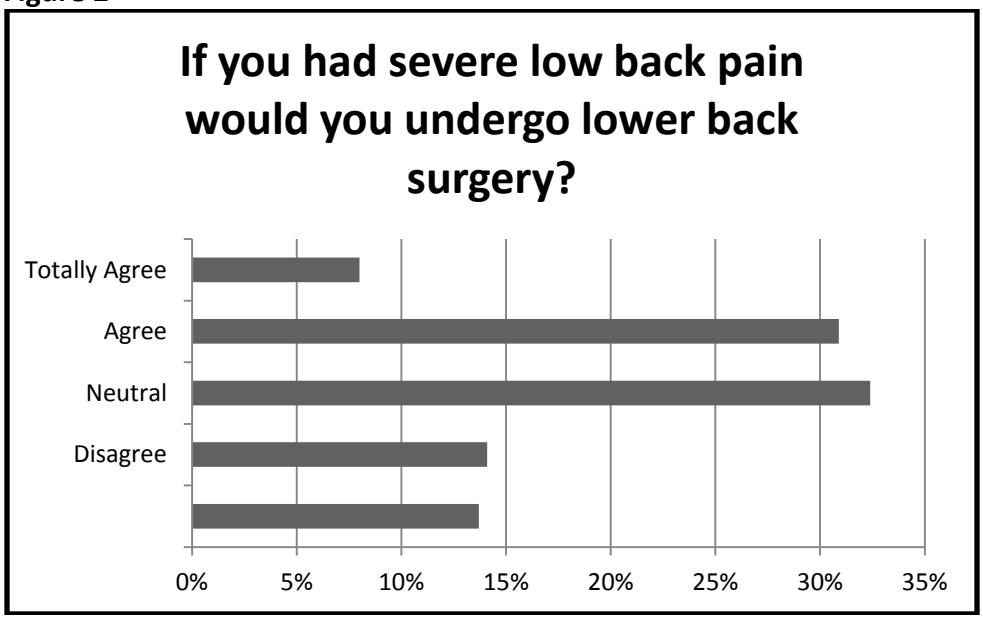


Figure 3

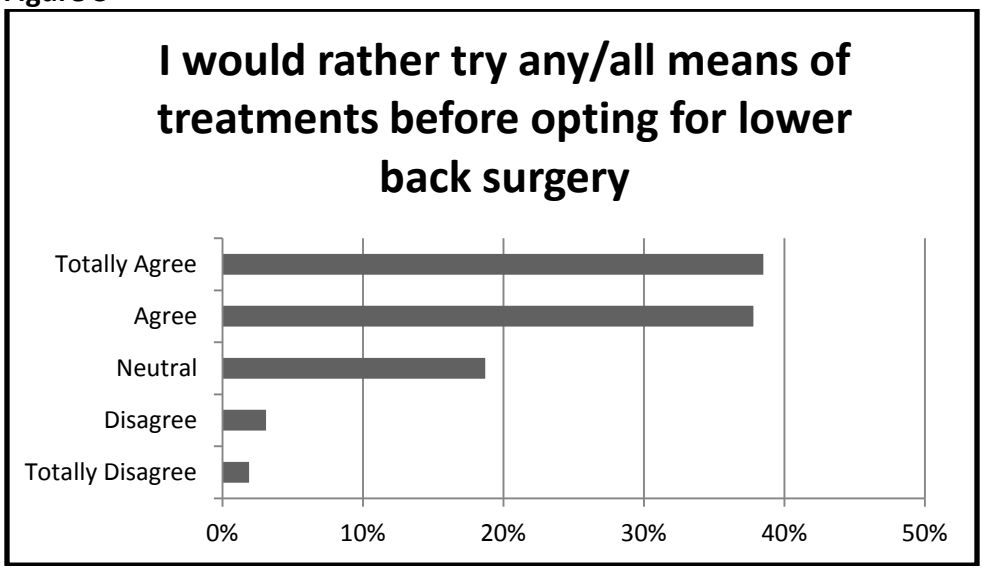


Figure 4

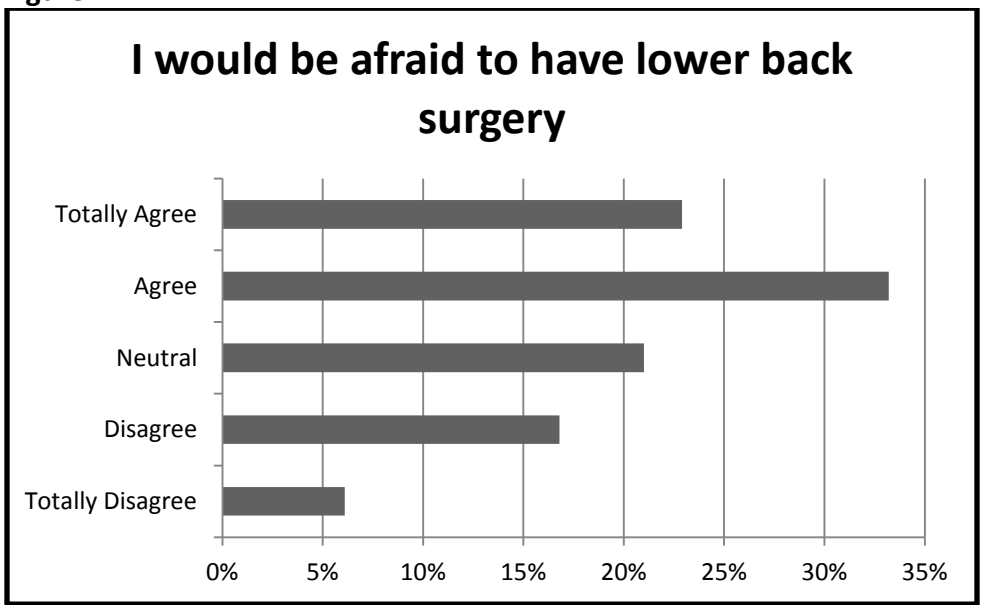


Table 1

Question	Statement	ANOVA p value
4	After LBS, people are able to return to their prior level of activity	p=.014
5	Following LBS you can expect the pain to be gone	p=.010
7	I would be afraid to have lower back surgery	p=.001
8	Side-effects are common after lower back surgery	p=.007
9	Following LBS, I would be afraid to return to work or participate in previous physical activities	p=.003
10	I would rather try any/all means of treatments (i.e., physical therapy, medication) before opting for lower back surgery	p=.003

Table 2

Question	Pain History and Mean Response				Tukey	Confidence Interval
4	No history	2.84	LBP requiring medical attention	3.23	p=.024	-.76 to -.04
5	No history	3.08	LBP requiring medical attention	3.52	p=.016	-.82 to -.06
7	Occasional back pain	2.72	LBP requiring medical attention	2.08	p=.007	.13 to 1.15
	Lower back surgery	3.36	LBP requiring medical attention	2.08	p=.005	-2.26 to -.30
8	No history	2.61	LBP requiring medical attention	2.24	p=.019	.04 to .69
9	Occasional LBP	2.95	LBP requiring medical attention	2.50	p=.034	.02 to .88
	Lower back surgery	3.55	LBP requiring medical attention	2.50	p=.007	-1.87 to -.22
10	Occasional LBP	1.80	Lower back surgery	2.64	p=.022	-1.60 to -.09
	LBP requiring medical attention	1.72	Lower back surgery	2.64	p=.012	-1.69 to -.15

APPENDIX A

Lumbar Surgery Questionnaire

Thank you for your participation in this study. Please provide the most appropriate answer to each question. Please complete ALL questions. There is no right or wrong answer. All information will be handled in confidence and no personal data will be collected.

Section 1: Demographic Data Sheet

1. What is your age? _____ years

2. What is your gender ☐ Male ☐ Female

3. Which state do you live in?_____

4. Which describes you the best?
   - ☐ White
   - ☐ Asian
   - ☐ Native Hawaiian and Other Pacific Islander
   - ☐ Black or African American
   - ☐ American Indian or Alaska Native
   - ☐ Two or more races
   - ☐ Some other race

   Ethnicity:
   - ☐ Hispanic/Latino
   - ☐ Non-Hispanic/Latino
   - ☐ Other: _____

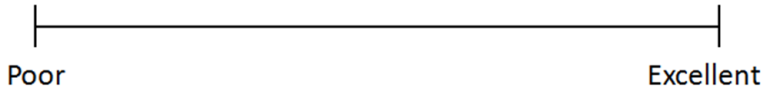
5. What is your current work status?
   - ☐ Employed – full time
   - ☐ Employed – part time
   - ☐ Unemployed
   - ☐ Disabled
   - ☐ Retired
   - ☐ Student

6. What is your educational background?
   - ☐ Post-graduate education (Masters, doctorate, etc.)
   - ☐ Graduate (Bachelors)
   - ☐ High school
   - ☐ Other. Please specify: _____

7. Which of the following best describes your income level?
   - ☐ Less than $10 000 per year
   - ☐ Between $10 000 and $50 000 per year
   - ☐ Between $50 000 and $100 000 per year
   - ☐ More than $100 000 per year

8. Do you have a personal history of low back pain?

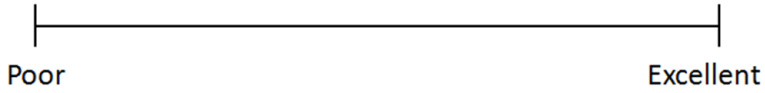
- No history of low back pain
- Occasional low back pain – no medical treatment
- Low back pain requiring medical attention (doctor, physical therapy, etc.)
- Lower back surgery
- If you have had lower back surgery, how would you rate your results?



9. Rate your current low back pain (0 = no pain and 10 = excruciating pain)

10. Which describes your family members the best (spouse, parent, sibling or child) with lower back pain?

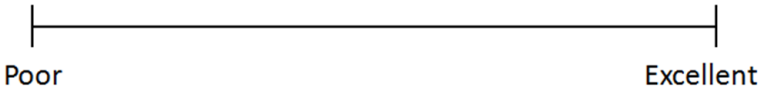
- No history of low back pain
- Occasional low back pain – no medical treatment
- Low back pain requiring medical attention (doctor, physical therapy, etc.)
- Lower back surgery
    - If a family member has had lower back surgery, how would you rate their results?



11. Have you had any other orthopedic surgeries before?

- No
- Yes
    - Upper extremity (shoulder, elbow or hand)
    - Lower extremity (hip, knee or ankle)
    - Upper back (including neck)

If you have had other orthopedic surgeries (above), how would you rate the results?



Lumbar Surgery Questionnaire

Please read the following statements. On the 5-point scale provided, please mark with an X your answer in relation to you “totally agreeing”, “agreeing”, “neutral”, “disagreeing” or “totally disagreeing” with the statement.

1. Lower back surgery is successful

□ Totally agree □ Agree□ Neutral □ Disagree □ Totally disagree

2. Lower back surgery is successful for treating pain in the lower back

□ Totally agree □ Agree□ Neutral □ Disagree □ Totally disagree

3. Lower back surgery is successful for treating symptoms into the leg (e.g. pain, numbness, weakness, tingling)

□ Totally agree □ Agree□ Neutral □ Disagree □ Totally disagree

4. After lower back surgery, people are able to return to their prior level of activity

□ Totally agree □ Agree□ Neutral □ Disagree □ Totally disagree

5. Following lower back surgery you can expect the pain to be gone

□ Totally agree □ Agree□ Neutral □ Disagree □ Totally disagree

6. If you had severe low back pain, would you undergo lower back surgery?

□ Totally agree □ Agree□ Neutral □ Disagree □ Totally disagree

7. I would be afraid to have lower back surgery

□ Totally agree □ Agree□ Neutral □ Disagree □ Totally disagree

8. Side-effects are common after lower back surgery

□ Totally agree □ Agree□ Neutral □ Disagree □ Totally disagree

9. Following back surgery, I would be afraid to return to work or participate in previous physical activities?

□ Totally agree □ Agree□ Neutral □ Disagree □ Totally disagree

10. I would rather try any/all other means of treatments (i.e., physical therapy, medication) before opting for lower back surgery

□ Totally agree □ Agree□ Neutral □ Disagree □ Totally disagree

11. Recovery time after low back surgery is long

□ Totally agree □ Agree□ Neutral □ Disagree □ Totally disagree