

CHAPTER IV

RESULTS

The purpose of this descriptive and inferential study was to explore the perceptions of speech-language pathologists and laryngectomees familiar with artificial larynx devices. The perceptions of both of these groups were analyzed in terms of reliability issues that may surround artificial larynx devices. Using a survey model, perspectives such as why artificial larynx devices fail and what features and characteristics are important were studied. This chapter presents descriptive and inferential statistics derived from the collected data. Data results are presented in three sections. The first two sections provide a descriptive analysis of the research samples for speech-language therapists and laryngectomees. The third section provides statistical information pertaining to the research questions.

Response Rates and Demographic Data of Speech Therapists

One of the two target populations for this study involved speech-language pathologists. A total of 544 packets containing questionnaires and qualification postcards were sent to speech-language pathologists. Recipients reflected the complete 2002 listing of the American Speech and Hearing Associations' Special Interest Voice Group. Of the packets sent out, two were undeliverable and returned to the investigator.

Three hundred seventy recipients returned the qualification postcard. Of this number, 231 indicated that they worked with artificial larynx devices and that they intended to return the survey instrument. Another 139 respondents returning the postcard indicated that they were unqualified to complete the instrument because they did not work with laryngectomees or artificial larynx devices. None of the recipients indicated that they could not complete the questionnaire due to time constraints or any other reason. A total of 228 questionnaires were completed and returned. Hence, of the 542 instruments sent out, 68% ($N=370$) responded using the qualification postcard. Of the professionals who returned the qualification postcard, 62% ($N=228$) indicated that they were qualified to proceed and completed the instrument. Babbie (1995) indicates that a return rate of 60 percent is good for statistical purposes. As an interesting side note relating to the sample and return rate, each of the packets sent to speech-language pathologists included a crisp one dollar bill. Fifty seven respondents returned the dollar to the researcher. Of those who returned the dollar, 19 were non-participants and 38 were participants. Hence, excluding the two packets that were returned due to non delivery, 485 of the speech pathologist recipients kept the dollar.

Table 1 reflects the descriptive statistics for the demographic data collected by the questionnaire. Of the 228 individuals who completed the survey instrument, one individual indicated that he or she did not work with laryngectomees and artificial larynx devices even though the instrument was completed. Just over 47% of the respondents worked in the field for 19 or less years. Of this group, 3.5% had worked in the field for 1-3 years; 10.5% for 4 – 7 years; 17.1% for 8 – 11 years; 3.9% for 12-15 years; and 12.3% for 16 – 19 years. Nearly 23% had worked in the field between 20-23 years. One

individual indicated that he or she had been in the field for 47 years. In terms of laryngectomees treated in a year's time, just over 47% reported that they treat between 1-5 laryngectomees. About 37% indicated that they see 6-25 laryngectomees per year. Thirty five professionals reported that they treat over 25 laryngectomees annually and one respondent indicated that he or she treats 60 laryngectomees per year.

Nearly 60% (N=134) of the respondents reported that they work in a hospital/clinic setting. Another 9% (N=21) work in a private clinic and 12% work in a private practice. Twelve percent (N=28) of the respondents worked in a university or college setting. The remaining minority of respondents worked in a variety of settings including public schools, ENT offices, etc. In terms of regions across America where respondents lived, nearly equal portions were observed in the East, Middle, South and West. Six percent (N=14) indicated that they lived in the North. Educationally, the majority of respondents, 75%, had a masters degree. The remaining respondents had a doctorate degree.

Table 1.

Demographic Characteristics of Speech-Language Pathologists

Characteristic	Frequency N=228	Relative Frequency %
<u>Years in Field</u>		
1-3	8	3.5
4-7	24	10.5
8-11	39	17.1
12-15	9	3.9
16-19	28	12.3
20-23	52	22.8
>23 years	68	29.8
<u>Patients Treated/Year</u>		
1-5	106	47.3
6-15	56	25.0
16-25	27	12.1
>25	35	15.6
No Answer	4	1.8

Table Continues

Table 1.

Demographic Characteristics of Speech-Language Pathologists

Characteristic	Frequency N=228	Relative Frequency %
<u>Work Setting</u>		
Hospital/Clinic	134	58.8
Private Clinic	21	9.2
University/College	28	12.3
Public School	2	.9
Private Practice	27	11.8
Other setting	16	7.0
<u>Residing Region</u>		
East	56	24.7
Middle	56	24.7
South	51	22.5
West	50	22.0
North	14	6.2
<u>Educational Level</u>		
Masters	171	76.0
Doctorate	54	24.0
No Answer	3	1.3

Response Rates and Demographic Data of Laryngectomees

Forty laryngectomee clubs located in the United States were used as the second target group in this study. Of the 40 clubs that expressed interest in the research, 29 clubs actually participated in the study. Two hundred ninety two questionnaires were distributed and 160 were completed and returned. This represents a 55% return rate. Babbie (1995) indicates that a “response rate of at least 50 percent is adequate for analysis and reporting. A response rate of at least 60 percent is good” (p.262).

Table 2 reflects the descriptive statistics for the demographic data collected from this group. Of the 160 respondents who completed the survey, 156 indicated that they used an electrolarynx to communicate. Four respondents left this question blank even though the instrument was completed. The largest group of respondents consisting of approximately 32% ($N=51$), reported that they had been a laryngectomee for 4-7 years. Another 29% indicated that they had been laryngectomized for 1-3 years. One individual reported being laryngectomized for 28 years and another for 27 years. Approximately 75% ($N=119$) were males and 23% were females.

The majority of respondents, 71% ($N=112$), were retired. Nearly 11% ($N=17$) indicated that they were disabled and did not work. Seven percent ($N=11$) indicated that they were blue collar workers and about 1% ($N=2$) were white collar workers. Nearly 40% of the respondents indicated that they lived in the east. The remaining regions, middle, south, west, and north were fairly equal in their numbers.

Table 2.

Demographic Characteristics of Laryngectomees

Characteristic	Frequency <u>N</u> =160	Relative Frequency %
<u>Years a Laryngectomee</u>		
<1	6	3.8
1-3	47	29.4
4-7	51	31.9
8-11	24	15.0
12-15	17	10.6
16-19	6	3.8
20-23	6	3.8
>23	3	1.2
<u>Gender</u>		
Male	119	76.8
Female	36	23.2
No Answer	5	3.1
<u>Occupation</u>		
Blue Collar	11	7.0
White Collar	2	1.3
Office Work	5	3.2
Work at Home	3	1.9
Retired	112	71.3
Disabled-Don't work	17	10.8
Other	7	4.4
<u>Residing Region</u>		
East	61	38.9
Middle	28	17.8
South	27	17.2
West	21	13.4
North	20	12.7

Table Continues

Table 2.

Demographic Characteristics of Laryngectomees

Characteristic	Frequency <u>N</u> =160	Relative Frequency %
<u>Educational Level</u>		
Some School	15	9.7
High School	71	44.4
Trade School	10	10.3
Community College/2-year Degree	29	19.0
4-Year Degree	15	9.7
Advanced Degree	9	5.8
<u>Amount of talking you do</u>		
Almost no talking	11	6.9
Small amount of talking	22	13.8
Medium amount of talking	57	35.6
Heavy amount of talking	66	41.3

In terms of educational levels, nearly 46% (N=71) of the respondents had a high school diploma. Nineteen percent (N=29) had a 2-year degree compared to nearly 10% (N=15) who had a four-year degree. Six percent (N=6) had an advanced degree. Ten percent (N=16) attended a trade school for their education.

Respondents indicated various levels of talking and categories were associated with the numbers of sentences spoken per day. In the no talking category, 10 or less sentences are spoken per day; in the small amount of talking category, 11-100 sentences are spoken per day; in the medium category, 101-300 sentences are spoken per day; and in the heavy category, 301 or more sentences are spoken per day. Just over 41% (N=66) of the respondents reported that they are heavy talkers with their artificial larynx. While

35.6 % (N=57) placed themselves in the medium category, another 13.8% indicated that they used their device a small amount. Eleven of the respondents or 6.9% indicated that they did almost no talking at all.

Results For Research Questions

Research Question #1

Research question #1 explored the practices of speech-language pathologists in advising laryngectomees in the use of artificial larynx devices. When asked how the artificial larynx device was obtained, 6.1% of speech therapists indicated that they give the names of suppliers to the patient and instruct them to get the machine on their own. Almost 27% of laryngectomee respondents reported that they got the device in the same way. Fifty seven percent of therapists expressed that they experiment with two or more devices per patient before a decision is made. On the other hand, only 15.6% of laryngectomees reported that they received their device after experimenting with two machines. Just over 37% of laryngectomees indicated that both the patient and therapist experimented with one device before a decision was made. One speech-language pathologist expressed that he or she experiments with four devices per patient. Another six speech therapists, 2.6%, indicated that they send the patient to the phone company for the device.

Both laryngectomee and speech pathologist respondents were asked when the patient is furnished with the artificial larynx in relationship to surgery. Just over 37% (N=60) of laryngectomees indicated that they received the machine about a month after their surgery. Almost 19% (N=43) of therapists, however, reported this same month

timeline. Nearly 28% (N=44) of laryngectomees said they got the device within a week after surgery and another 23.1% reported they got the device 2-5 months after surgery. Nearly 60% of therapists said they furnished the device about a week after surgery and 5.3% said they provide the device in 2-5 months. Just over 6.3% (N=10) of laryngectomees received the device 6 or more months after surgery compared to 1.8% (N=4) indicated by speech therapists.

When asked how satisfied they were with their training on artificial larynx devices, 31.6% (N=72) of the therapists queried indicated that they were very satisfied and 34.2% checked that they were satisfied. Another 31.6% of the respondents indicated that they were either somewhat dissatisfied or unsatisfied with the training they received. Nearly 39% (N=62) of the laryngectomee respondents indicated that they were very satisfied with the training they received on the artificial larynx. Another 37% (N=59) expressed that they were satisfied with the training and 7.5% (N=12) indicated that they were somewhat unsatisfied. Table 3 shows the satisfaction ratings for both groups.

Table 3.

Satisfaction Ratings For Received Training By Therapists and Laryngectomees

Rating	SLP Frequency (%)	LAR Frequency (%)
Very satisfied	72 (31.6)	62 (38.8)
Satisfied	78 (34.2)	59 (36.9)
Somewhat unsatisfied	38 (16.7)	12 (7.5)
Unsatisfied	34 (14.9)	11 (6.9)
No response/Don't know	6 (2.6)	16 (10.1)
Total	228	160

Note: SLP = Speech-Language Pathologist; LAR = Laryngectomees

In regards to the statement, “Artificial larynx devices should be a last resort when other speech methods have failed,” 71.1% (N=162) of the speech therapists disagreed. Another 14% indicated that they somewhat disagreed and a small group consisting of 10.9% indicated that they either agreed or strongly agreed with the statement. About 43% (N=69) of the laryngectomees disagreed with the statement that “artificial larynx devices should be used as a last resort when other speech methods have failed.” Nearly 32% (N=51) either agreed or strongly agreed with the statement. Table 4 shows the level of agreement to the question.

Table 4.

Agreement With The Question: Artificial Larynx Should Be A Last Resort When Other Speech Methods Have Failed

Agreement	SLP Frequency (%)	LAR Frequency (%)
Strongly Agree	11 (4.8)	23 (14.4)
Agree	14 (6.1)	28 (17.5)
Somewhat Agree	32 (14.0)	21 (13.1)
Disagree	162 (71.1)	69 (43.1)
No response/Don't know	9 (3.9)	19 (11.9)
Total	228	160

Note: SLP = Speech-Language Pathologist; LAR = Laryngectomees

A portion of respondents from both groups offered comments regarding artificial larynx devices. These comments, collapsed in terms of their themes, are a reflection of the practices by therapists and the end users of artificial larynx devices. The following is a list of the themes, first by speech-language pathologists and then by laryngectomees. The number that follows the statement reflects the frequency which the theme was observed.

Speech-Language Pathologist Comment Themes (N=132)

1. Artificial larynx is important to all laryngectomees, even as a backup device (n=47).
2. Every laryngectomee, regardless of primary modality, should have an artificial larynx device (n=31).
3. Tracheoesophageal Prosthesis is the most popular method of alaryngeal speech (n=26).
4. Artificial larynx devices offer quick communication after surgery (n=12).
5. Many patients and hospitals cannot afford artificial larynx devices (n=6).
6. Devices should be introduced before surgery (n=5).
7. Intraoral adaptors are useful (n=2).
8. Artificial larynx devices are good for patients with edema or radiation scarring (n=2).
9. Sign language is important to teach laryngectomee patients (n=1).

Laryngectomy Comment Themes (N=32)

1. Sound quality needs to be improved so it is less robotic and more like a male or a female (n=7).
2. I have problems being understood on the phone (n=6).
3. Devices need more volume. They are not good in noisy conditions (n=4).
4. Devices need a whisper mode (n=4).
5. A comment reflecting a positive outlook, ie., I am happy to be alive. I am satisfied with my current situation (n=3).
6. Medicare and insurers do not pay enough and the cost is too high (n=2).
7. Artificial larynx is important to all laryngectomees, even as a backup device (n=2).
8. The battery is hard to fit (n=2).
9. The battery should be a standard, easy to get size (n=2).

Research Question #2

Respondents of both groups reported their perceptions involving the causes of artificial larynx problems. Various causes were listed and respondents were asked to rate their importance individually. A large segment of laryngectomees responded with a “Don’t know” indication for each of the seven causes listed. Depending on the variable queried, this accounted for 55% – 81.9% of the responses. Conversely, a large portion of speech therapists responded to these questions. Table 5 shows the frequency and percentage of respondents who reported that the listed factors were important or very

important causes of device break down. Laryngectomee respondents expressed that excessive shock, battery problems, and exposure to water or chemicals were the leading causes of failure. These same responses were closely paralleled by the therapist respondents.

Table 5.

Perceived Causes of Artificial Larynx Problems

Perceived Causes	SLP Frequency (%)		LAR Frequency (%)	
Dropped or bumped	169	(74.1)	58	(36.2)
Battery or charger problems	159	(69.8)	32	(20.0)
Exposed to water or chemicals	125	(58.8)	30	(18.7)
Got too dirty	111	(48.7)	26	(16.3)
Poor overall reliability	124	(54.4)	25	(15.6)
Device wore out	98	(43.0)	18	(11.3)
Exposed to excessive temperatures	36	(15.8)	17	(10.7)

Note: SLP = Speech-Language Pathologist; LAR = Laryngectomees

On average, speech therapist respondents ($N=106$) indicated that the artificial larynx device lasts 4.1 years before it starts to breakdown. Laryngectomee respondents ($N=50$) indicated an average of 3.7 years before breakdowns occur.

Respondents were asked their amount of agreement concerning the perceived changes associated with the age of the device. Table 6 shows the frequencies and percentages of respondents who agreed or strongly agreed with given factors associated with age-related changes. Of all the listed options, laryngectomee respondents indicated

that decreased volume, decreased battery life, increased distortion, and cutting out accounted for the most changes over time. Speech therapists also paralleled these same responses.

Table 6.

Perceived Changes In Artificial Larynx Function Over Time

Perceived Changes	SLP Frequency (%)		LAR Frequency (%)	
Batteries don't last	146	(64.1)	43	(26.9)
More distortion	133	(58.3)	40	(25.1)
Cuts out	127	(55.7)	33	(20.6)
Decreased volume	127	(55.8)	45	(28.2)
Buttons sloppy or loose	80	(35.1)	30	(18.7)
Parts chipped or cracked	95	(41.7)	24	(16.0)
Pitch changes	64	(28.1)	29	(18.1)
Volume changes	74	(32.4)	31	(19.4)

Note: SLP = Speech-Language Pathologist; LAR = Laryngectomees

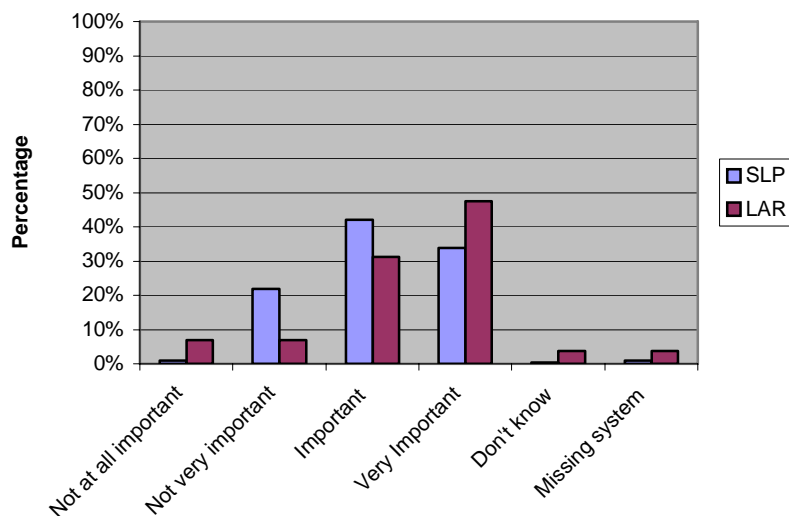
Research Question #3

The third research question explored the features and characteristics that are important to speech-language pathologists and laryngectomees. Participants in the survey were asked to rate various device features or characteristics in terms of their importance.

When the rating of artificial larynx features are studied, the most striking differences between speech-language pathologists and laryngectomees dealt with

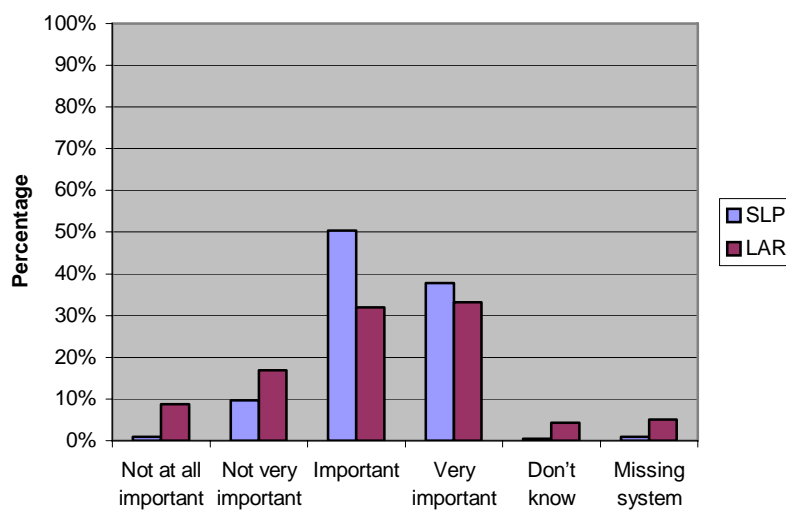
1) pitch range, 2) weight, 3) size of the on/off buttons/dials, 4) the pressure needed to make a seal on the neck, and 5) comfort of use. Pitch range is the only feature where laryngectomees had a greater proportion of respondents rate as very important (47.5%) than speech-language pathologists (33.7%). Slightly more than 50% of speech-language pathologists rated weight of the device as important while only 31.88% of laryngectomees did so. The proportion of speech-language pathologists and laryngectomees that rated weight as very important was similar. A larger proportion of therapists (49.56%) rated the size of on/off buttons as very important more so than laryngectomees (33.13%). The pressure needed to make a seal on the neck was also viewed as very important by 70.18% of speech-language pathologists, while 48.13% of laryngectomees saw this feature as very important.

A greater proportion of speech-language pathologists rated the comfort of use as very important (80.7%) more so than did laryngectomees (63.13%). In either group, however, the device being comfortable to use was the feature that had the greatest mutual rating perceived to be very important. Figures 2A – 2E visually depict the comparison between therapists and laryngectomees regarding pitch range, weight, button/dial size, neck pressure, and comfort of use.



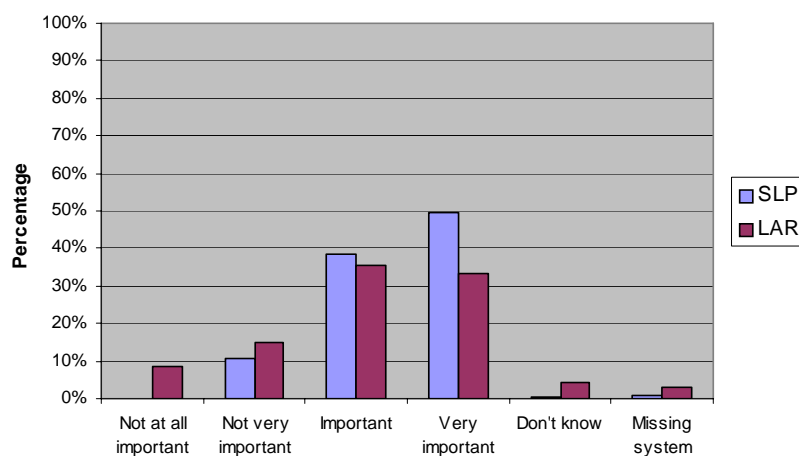
Note: SLP = Speech-Language Pathologist; LAR = Laryngectomees

Figure 2A. Importance of pitch range to speech-language pathologists and laryngectomees.



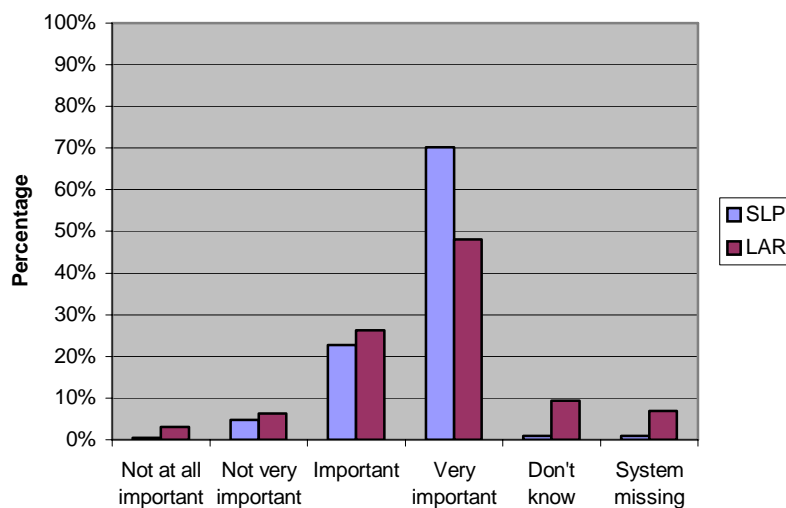
Note: SLP = Speech-Language Pathologist; LAR = Laryngectomees

Figure 2B. Importance of device weight to speech-language pathologists and laryngectomees.



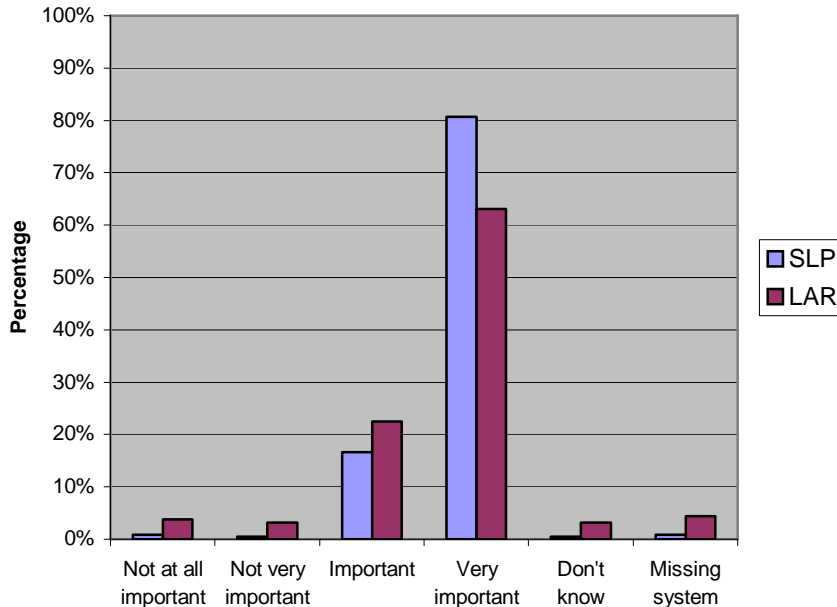
Note: SLP = Speech-Language Pathologist; LAR = Laryngectomees

Figure 2C. Importance of the size of on/off buttons and dials to speech-language pathologists and laryngectomees.



Note: SLP = Speech-Language Pathologist; LAR = Laryngectomees

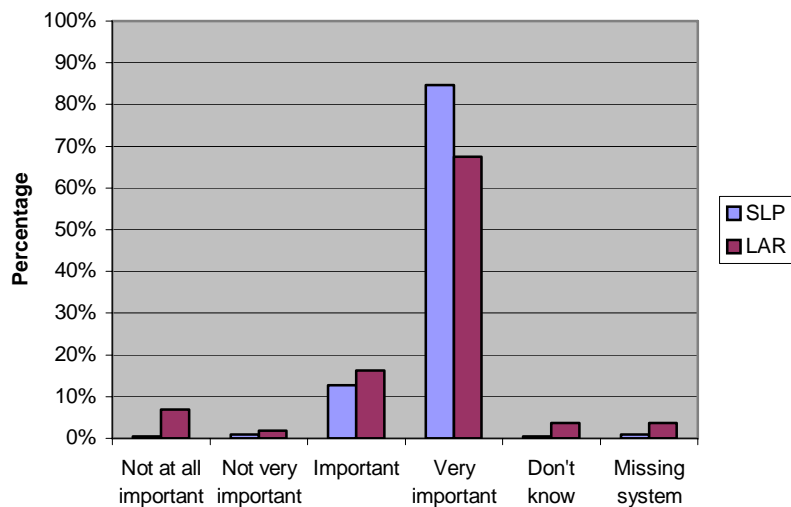
Figure 2D. Importance of the pressure needed to make a seal on the neck by speech language-pathologists and laryngectomees.



Note: SLP = Speech-Language Pathologist; LAR = Laryngectomees

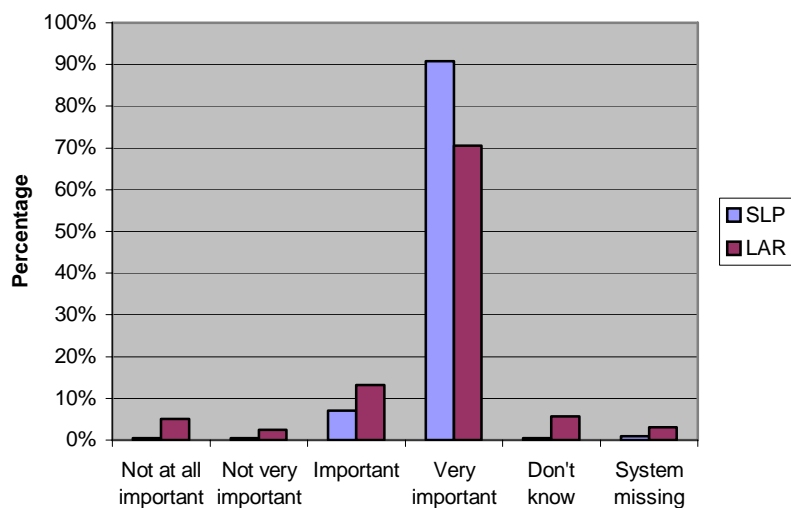
Figure 2E. Importance of comfortable to use to speech-language pathologists and laryngectomees.

When the rating of characteristics are studied individually, differences between speech-language pathologists and laryngectomees are noted. Every characteristic with the exception of easy to use and good sound quality had a greater proportion of laryngectomees rating the characteristic as very important than speech-language pathologists. These characteristics included long talk time, easy to get from the manufacturer, ease of battery replacement, good inflection, powerful, and cost. The characteristic receiving the greatest proportion of very important ratings by both speech pathologists (90.79%) and laryngectomees (70.63%) was good sound quality. Figures 3A – 3G show the comparison between therapists and laryngectomees in regards to device characteristics.



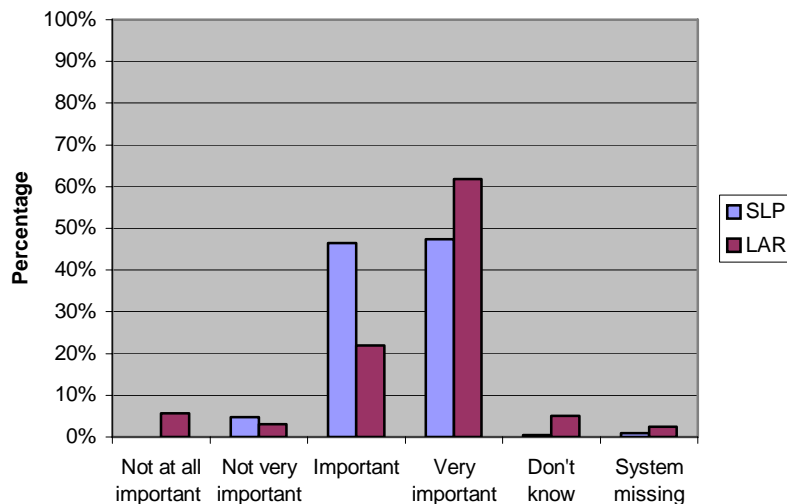
Note: SLP = Speech-Language Pathologist; LAR = Laryngectomees

Figure 3A. Importance of ease of use to speech-language pathologists and laryngectomees.



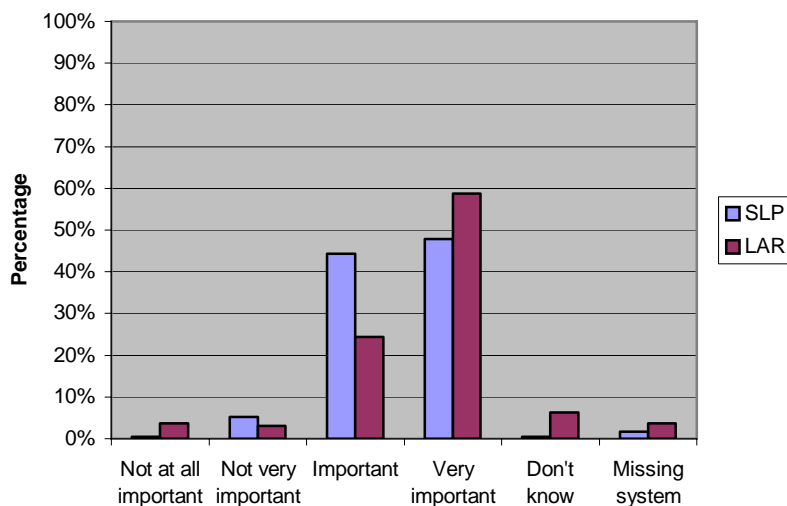
Note: SLP = Speech-Language Pathologist; LAR = Laryngectomees

Figure 3B. Importance of good sound quality to speech-language pathologists and laryngectomees.



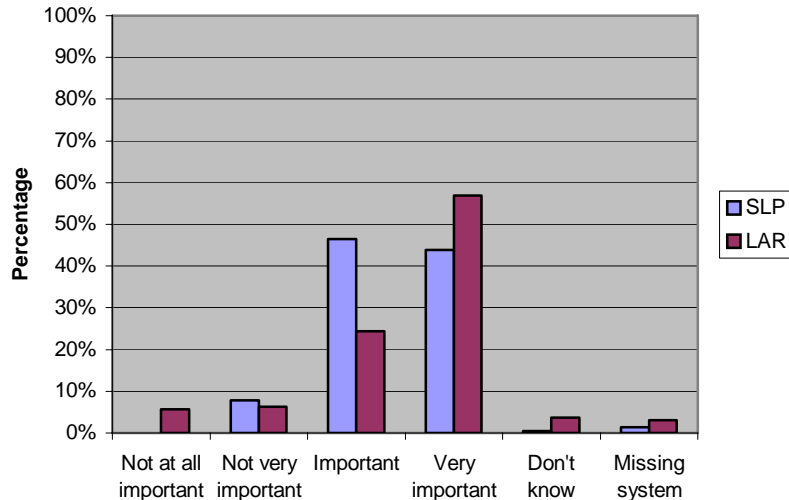
Note: SLP = Speech-Language Pathologist; LAR = Laryngectomees

Figure 3C. Importance of long talk time to speech-language pathologists and laryngectomees.



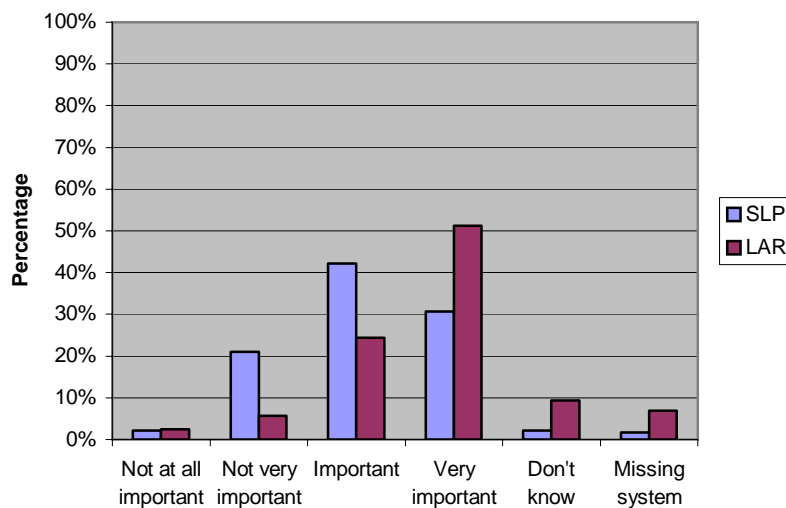
Note: SLP = Speech-Language Pathologist; LAR = Laryngectomees

Figure 3D. Importance of easy to get from the distributor or manufacturer to speech-language pathologists and laryngectomees.



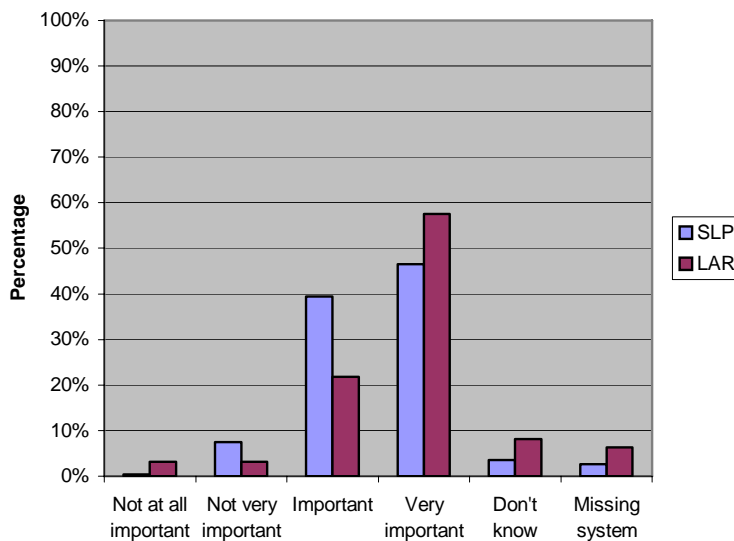
Note: SLP = Speech-Language Pathologist; LAR = Laryngectomees

Figure 3E. Importance of ease of battery replacement to speech-language pathologists and laryngectomees.



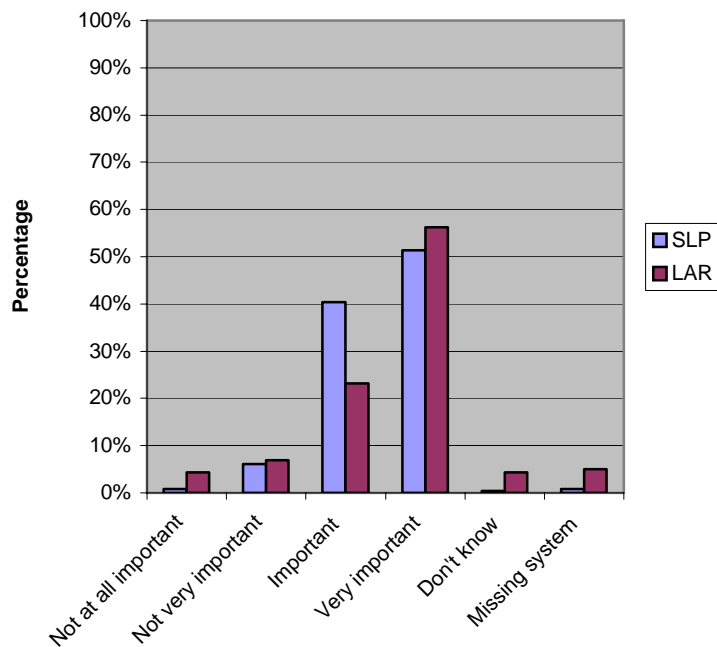
Note: SLP = Speech-Language Pathologist; LAR = Laryngectomees

Figure 3F. Importance of good inflection to speech-language pathologists and laryngectomees.



Note: SLP = Speech-Language Pathologist; LAR = Laryngectomees

Figure 3G. Importance of power to speech-language pathologists and laryngectomees.



Note: SLP = Speech Language Pathologist; LAR = Laryngectomees

Figure 3H. Importance of cost to laryngectomees and speech-language pathologists.

After generally rating features and characteristics based on their level of importance, respondents had the opportunity to more specifically rate the importance of features and characteristics. This was accomplished by further rating the top three feature and characteristic variables using a most important, next important, and third most important format.

While laryngectomees indicated that volume range was most important (49.4%), the majority of speech-language pathologist respondents (26.8%) reported that comfortable to use was most important. In terms of the features considered next most important, laryngectomees (23.8%) listed pitch range while therapists (22%) listed volume range. When considering the features third most important, laryngectomees (23.1%) listed comfort of use, and speech-language pathologists (18.4%) indicated overall size of the device.

In terms of device characteristics found to be most important, 32.5 % of laryngectomees listed easy to use, and 46.5% of speech therapists indicated good sound quality. Both groups reported that good sound quality was the next most important characteristic. Regarding the third most important characteristic, laryngectomees (13.8%) reported good sound quality, and speech therapists (21.9%) listed cost. Tables 7 and 8 show the ratings of features and characteristics in terms of most important, next important, and third most important.

Table 7.

Frequencies: Features By Most, Next Most, And Third Most Important

Feature	<u>Most Important</u>		<u>Next Most Important</u>		<u>Third Most Important</u>	
	SLP (%)	LAR (%)	SLP (%)	LAR (%)	SLP (%)	LAR (%)
Volume range	53 (23.3)	79 (49.4)	50 (22.0)	13 (8.1)	32 (14.0)	11 (6.9)
Pitch range	17 (7.5)	3 (1.9)	29 (12.7)	38 (23.8)	18 (7.9)	10 (6.3)
Weight	6 (2.6)	2 (1.3)	16 (7.0)	9 (5.6)	21 (9.2)	16 (10.0)
Size of on/off buttons and dials	9 (4.0)	1 (0.6)	26 (11.4)	10 (6.3)	39 (17.1)	3 (1.9)
Overall size of the device	12 (5.3)	4 (2.5)	21 (9.2)	15 (9.4)	42 (18.4)	11 (6.9)
Pressure needed to make a seal on the neck	59 (25.9)	8 (5.0)	39 (17.1)	18 (11.3)	26 (11.4)	22 (13.8)
Comfortable to use	61 (26.8)	15 (9.4)	40 (17.5)	11 (6.9)	40 (17.5)	37 (23.1)
Other response*	5 (2.2)	2 (1.3)	1 (0.4)	1 (0.6)	2 (0.9)	0 (0.0)
Missing data	6 (2.6)	46 (28.8)	6 (2.6)	45 (28.1)	8 (3.5)	50 (31.3)
Total	228	160	228	160	228	160

Note: * Reflected such responses as battery type, durability, ease of controls, tone quality, intraoral adaptor.
 SLP = Speech-Language Pathologist; LAR = Laryngectomees

Table 8.

Frequencies: Characteristics By Most Important, Next Most, And Third Most Important

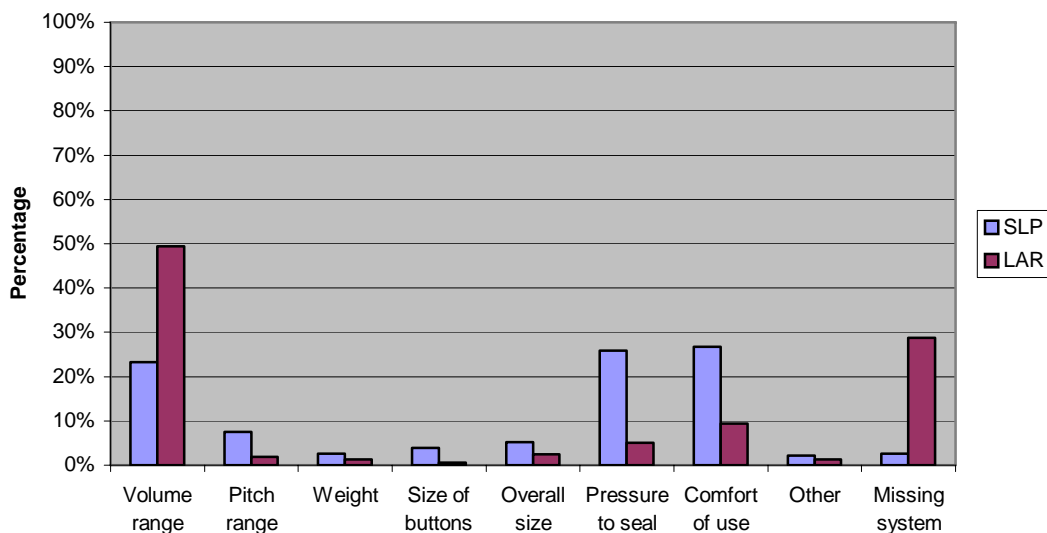
Characteristic	<u>Most Important</u>		<u>Next Most Important</u>		<u>Third Most Important</u>	
	SLP (%)	LAR (%)	SLP (%)	LAR (%)	SLP (%)	LAR (%)
Easy to use	88 (38.6)	52 (32.5)	50 (21.9)	13 (8.1)	34 (14.9)	8 (5.0)
Long talk time	2 (0.9)	17 (10.6)	19 (8.3)	30 (18.8)	32 (14.0)	15 (9.4)
Good sound quality	106 (46.5)	31 (19.4)	79 (34.7)	38 (23.8)	20 (8.8)	22 (13.8)
Easy to get from distributor or manufacturer	0 (0.0)	0 (0.0)	16 (7.0)	3 (1.9)	18 (7.9)	3 (1.9)
Cost	8 (3.5)	5 (3.1)	19 (8.3)	8 (5.0)	50 (21.9)	19 (11.9)
Ease of battery replacement	2 (0.9)	1 (0.6)	3 (1.3)	9 (5.6)	22 (9.7)	12 (7.5)
Good inflection	5 (2.2)	2 (1.3)	13 (5.7)	7 (4.4)	15 (6.6)	16 (10.0)
Powerful	5 (2.2)	1 (0.6)	17 (7.5)	5 (3.1)	22 (9.7)	17 (10.6)
Missing data	11 (4.8)	48 (30.0)	8 (3.5)	45 (28.1)	10 (4.4)	47 (29.4)
Total	228	160	228	160	228	160

Note: SLP = Speech-Language Pathologist; LAR = Laryngectomees

Figures 4A and 4B are visual

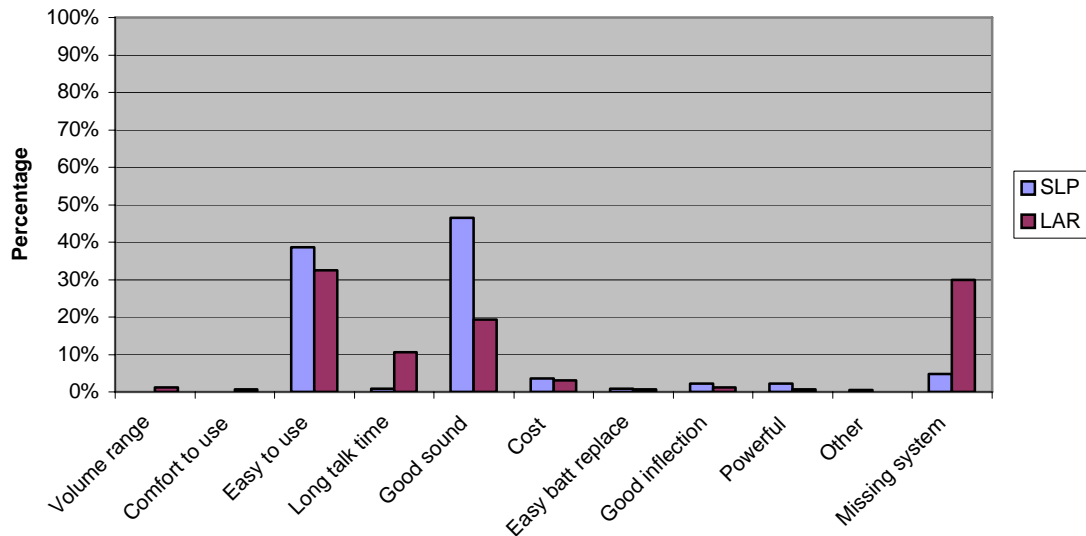
representations between laryngectomees and speech therapists as they relate to the importance or device features and characteristics. The most important feature to speech-language pathologists was split between three of the features listed; comfortable to use (26.75%), pressure needed to make a seal on the neck (25.88%), and volume range (23.25%).

In terms of characteristics rated as most important, speech-language pathologists showed a split between good sound (46.49%) and easy to use (38.6%). The most important characteristic to laryngectomees was easy to use (33.5%) followed by good sound (19.38%). While speech-language pathologists responded to this question, a large proportion of laryngectomee respondents (30%) did not answer this question.



Note: SLP = Speech-Language Pathologist; LAR = Laryngectomees

Figure 4A. Rated most important features by speech-language pathologists and laryngectomees.



Note: SLP = Speech Language Pathologist; LAR = Laryngectomees

Figure 4B. Rated most important characteristic by speech-language pathologists and laryngectomees.

Research Question #4

Research Question #4 examined whether or not there are significant differences in the perceived importance of features and characteristics between speech-language pathologists and laryngectomees. A Chi Square statistic was computed for each of the seven features and eight characteristics. The hypothesis for each of the features and characteristics is that there will be a difference in the importance rating given by speech-language pathologists and laryngectomees. The null hypothesis is that there will be no difference in the importance rating given by speech-language pathologists and

laryngectomees. Due to small cell sizes in the “not at all important” and “not important” categories, these two categories were combined for more meaningful interpretation of the data. Respondents who indicated a “don’t know” response or left the answer blank were excluded from the analysis.

Only one of the features/characteristics revealed no significant difference between the groups. All the other variables, with the exception of volume, showed a significant difference between speech-language pathologists and laryngectomees. Table 9 shows the Chi Square results for each of the features and characteristics. Where pitch range was concerned, more laryngectomees and fewer speech therapists than expected rated pitch range as very important. This same pattern was observed with ease of procurement, cost, ease of battery replacement, good inflection, and power. On the other hand, more speech-language pathologists and fewer laryngectomees than expected rated the following as very important: weight, size of buttons, overall size, seal pressure, comfort, ease of use, and sound quality.

Table 9.

Observed and Expected Frequencies For Importance Ratings by Speech Pathologists and Laryngectomees

Volume Range

Type of Respondent	Not Important		Important		Very Important		Totals
	Observed	Expected	Observed	Expected	Observed	Expected	
SLP	11	(12.69)	62	(54.99)	153	(158.32)	226
LAR	<u>10</u>	(8.31)	<u>29</u>	(36.01)	<u>109</u>	(103.68)	<u>148</u>
Totals	21		91		262		374

$X^2 = 3.28, df = 2, p > .10$

Note: SLP = Speech-Language Pathologist; LAR = Laryngectomees

Pitch

Type of Respondent	Not Important		Important		Very Important		Totals
	Observed	Expected	Observed	Expected	Observed	Expected	
SLP	52	(44.64)	96	(88.07)	77	(92.29)	225
LAR	22	(29.36)	50	(57.93)	76	(60.70)	148
Totals	74		146		153		373

$X^2 = 11.25, df = 2, p < .01$

Weight

Type of Respondent	Not Important		Important		Very Important		Totals
	Observed	Expected	Observed	Expected	Observed	Expected	
SLP	24	(39.53)	115	(100.95)	86	(84.53)	225
LAR	<u>41</u>	(25.47)	<u>51</u>	(65.05)	<u>53</u>	(54.47)	<u>145</u>
Totals	65		166		139		370

$X^2 = 20.62, df = 2, p < .001$

Table Continues

Table 9.

Observed and Expected Frequencies For Importance Ratings by Speech Pathologists and Laryngectomees

Size of On/Off Buttons

Type of Respondent	Not Important		Important		Very Important		Totals
	Observed	Expected	Observed	Expected	Observed	Expected	
SLP	24	(37.40)	88	(87.47)	113	(100.13)	225
LAR	<u>38</u>	(24.60)	<u>57</u>	(57.53)	<u>53</u>	(65.87)	<u>148</u>
Totals	62		145		166		373

$X^2 = 16.27, df = 2, p < .001$

Overall Size of Device

Type of Respondent	Not Important		Important		Very Important		Totals
	Observed	Expected	Observed	Expected	Observed	Expected	
SLP	15	(21.58)	94	(93.52)	117	(110.90)	226
LAR	<u>21</u>	(14.42)	<u>62</u>	(62.48)	<u>68</u>	(74.10)	<u>151</u>
Totals	36		156		185		377

$X^2 = 5.85, df = 2, p < .02$

Note: SLP = Speech-Language Pathologist; LAR = Laryngectomees

Pressure Needed To Make Neck Seal

Type of Respondent	Not Important		Important		Very Important		Totals
	Observed	Expected	Observed	Expected	Observed	Expected	
SLP	12	(16.89)	52	(58.82)	160	(148.29)	224
LAR	<u>15</u>	(10.11)	<u>42</u>	(35.18)	<u>77</u>	(88.71)	<u>134</u>
Totals	27		94		237		358

$X^2 = 8.37, df = 2, p < .01$

Table Continues

Table 9.

Observed and Expected Frequencies For Importance Ratings by Speech Pathologists and Laryngectomees

Comfortable To Use

Type of Respondent	Not Important		Important		Very Important		Totals
	Observed	Expected	Observed	Expected	Observed	Expected	
SLP	3	(8.45)	38	(44.64)	184	(171.92)	225
LAR	<u>11</u>	(5.55)	<u>36</u>	(29.36)	<u>101</u>	(113.08)	<u>148</u>
Totals	14		74		285		373

$X^2 = 13.48, df = 2, p < .01$

Note: SLP = Speech-Language Pathologist; LAR = Laryngectomees

Easy To Use

Type of Respondent	Not Important		Important		Very Important		Totals
	Observed	Expected	Observed	Expected	Observed	Expected	
SLP	3	(10.25)	29	(33.18)	193	(181.57)	225
LAR	<u>14</u>	(6.74)	<u>26</u>	(21.82)	<u>108</u>	(119.43)	<u>148</u>
Totals	17		55		301		373

$X^2 = 16.07, df = 2, p < .001$

Long Talk Time

Type of Respondent	Not Important		Important		Very Important		Totals
	Observed	Expected	Observed	Expected	Observed	Expected	
SLP	11	(15.08)	106	(85.05)	108	(124.87)	225
LAR	<u>14</u>	(9.92)	<u>35</u>	(55.95)	<u>99</u>	(82.13)	<u>148</u>
Totals	25		141		207		373

$X^2 = 21.52, df = 2, p < .001$

Table Continues

Table 9.

Observed and Expected Frequencies For Importance Ratings by Speech Pathologists and Laryngectomees

Good Sound Quality

Type of Respondent	Not Important		Important		Very Important		Totals
	Observed	Expected	Observed	Expected	Observed	Expected	
SLP	2	(8.49)	16	(22.44)	207	(194.07)	225
LAR	<u>12</u>	(5.51)	<u>21</u>	(14.56)	<u>113</u>	(125.93)	<u>146</u>
Totals	14		37		320		371

$X^2 = 19.49, df = 2, p < .001$

Easy To Get From Distributor

Type of Respondent	Not Important		Important		Very Important		Totals
	Observed	Expected	Observed	Expected	Observed	Expected	
SLP	12	(13.95)	101	(84.92)	109	(123.13)	222
LAR	<u>11</u>	(9.05)	<u>39</u>	(55.09)	<u>94</u>	(79.87)	<u>144</u>
Totals	23		140		203		366

$X^2 = 12.57, df = 2, p < .01$

Cost

Type of Respondent	Not Important		Important		Very Important		Totals
	Observed	Expected	Observed	Expected	Observed	Expected	
SLP	16	(20.68)	92	(78.45)	117	(125.88)	225
LAR	<u>18</u>	(13.32)	<u>37</u>	(40.55)	<u>90</u>	(81.12)	<u>145</u>
Totals	34		129		207		370

$X^2 = 10.27, df = 2, p < .01$

Table Continues

Table 9.

Observed and Expected Frequencies For Importance Ratings by Speech Pathologists and Laryngectomees

Ease Of Battery Replacement

Type of Respondent	Not Important		Important		Very Important		Totals
	Observed	Expected	Observed	Expected	Observed	Expected	
SLP	18	(22.22)	106	(87.08)	100	(114.70)	224
LAR	<u>19</u>	(14.78)	<u>39</u>	(57.92)	<u>91</u>	(76.30)	<u>149</u>
Totals	34		145		191		373

$X^2 = 17.02, df = 2, p < .001$

Good Inflection

Type of Respondent	Not Important		Important		Very Important		Totals
	Observed	Expected	Observed	Expected	Observed	Expected	
SLP	53	(40.95)	96	(83.75)	70	(94.30)	219
LAR	<u>13</u>	(25.05)	<u>39</u>	(51.25)	<u>82</u>	(57.70)	<u>134</u>
Totals	66		135		152		353

$X^2 = 30.56, df = 2, p < .001$

Power

Type of Respondent	Not Important		Important		Very Important		Totals
	Observed	Expected	Observed	Expected	Observed	Expected	
SLP	18	(17.07)	90	(76.21)	106	(120.72)	214
LAR	<u>10</u>	(10.93)	<u>35</u>	(48.79)	<u>92</u>	(77.28)	<u>137</u>
Totals	28		125		198		351

$X^2 = 11.12, df = 2, p < .01$

Research Question #5

Research Question #5 explored which devices are most widely recommended and used in the United States. This question was analyzed using descriptive statistics.

The most prevalent device used by respondents in this survey is the Servox Inton. Close to 80% of the laryngectomees who responded to this question indicated that the Servox Inton was his or her primary artificial larynx device. Another 3.3% of the respondents indicated that the Servox Inton and one other device were his or her primary device. Table 10 shows the primary devices used by the laryngectomee respondents.

Table 10.

Primary Device Used by Laryngectomees

Name of Primary Device Used	Number	%
Servox Inton	122	79.74
TruTone	7	4.58
Romet	6	3.92
NuVois Model II	5	3.27
Optivox	3	1.96

The most prevalent artificial larynx device recommended by speech-language pathologists in this study was the Servox Inton. Of the 220 pathologists who responded to this question, 88.2% indicated that the Servox Inton was one of the two devices recommended most. Following the Servox, the TruTone (24%) and Romet (22%) were the next most prevalent devices recommended by speech therapists. Table 11 shows the combination of devices recommended by speech-language pathologists.

Table 11.

Two Devices Recommended Most by Speech Language Pathologists

Names of Two Devices Recommended Most	Number	%
Servox Inton and TruTone	42	(19.09)
Servox Inton	41	(18.64)
Romet and Servox Inton	40	(18.18)
NuVois Model II and Servox Inton	18	(8.18)
Optivox and Servox Inton	14	(6.36)
Servox Inton and Cooper Rand	11	(5.00)
NuVois Model I and Servox Inton	10	(4.55)
Servox Inton and SPKR	6	(2.73)
Servox Inton and SolaTone	5	(2.27)
NuVois Model II and TruTone	3	(1.36)
NuVois Model I	2	(.91)
NuVois Model II	2	(.91)
Cooper Rand	2	(.91)
Amplicord Model 95 and NuVois Model II	2	(.91)
Romet and TruTone	2	(.91)
Romet and Cooper Rand	2	(.91)
Optivox, Servox Inton, TruTone	2	(.91)

Research Question #6

Research Question #6 explored how satisfied speech-language pathologists were with the devices they recommend, and how satisfied laryngectomees are with the artificial larynx devices they use. Using a four point question, respondents were asked to rate their satisfaction of the devices they recommend or use. Just over 53% of laryngectomees were very satisfied with their artificial larynx devices. On the other hand, only 31.1% of speech-language pathologists reported this same level of satisfaction. Table 12 shows the satisfaction ratings for both groups.

Table 12.

Satisfaction Ratings For Speech Therapists and Laryngectomees

Rating	SLP Frequency (%)	LAR Frequency (%)
Very satisfied	71 (31.1)	85 (53.1)
Satisfied	123 (53.9)	54 (33.8)
Somewhat unsatisfied	28 (12.3)	17 (10.6)
Unsatisfied	0	2 (1.3)
No Response	6 (2.6)	2 (1.3)
Total	228	160

Research Question #7

Research Question #7 asked how speech-language pathologists and laryngectomees rate the reliability of the artificial larynx devices recommended and used, and what differences exist between the groups. This question was analyzed using descriptive and Chi Square statistics. Of the 11 artificial larynx devices listed in the survey, only four devices were indicated by more than three or four laryngectomee respondents as the primary machine used. These devices included the NuVois II, Romet, Servox Inton, and the TruTone. The Servox Inton and the TruTone had the highest reliability ratings at 56.9% and 50% respectively. When the focus was turned to the speech-language pathologists, eight devices were indicated by more than four respondents as one of the two primary machines recommended. Accordingly, reliability ratings were obtained on the TruTone, Servox, Romet, NuVois Model II, NuVois Model I, Optivox, SolaTone, and SPKR. Speech-language therapists rated the TruTone (44.2%) and the Servox Inton (38.7%) with the highest reliability. Tables 13 and 14 show the percentages for each reliability rating by device according to laryngectomees and therapists. In order to display the data for similar comparison, the same four devices are shown for both groups. The additional four remaining devices indicated by speech-language pathologists are shown in Table 15. The small numbers associated with some devices are acknowledged by the investigator.

Table 13.

Devices And The Percent of Reliability Ratings According to Laryngectomees

	<u>Excellent</u>	<u>Good</u>	<u>Fair</u>	<u>Poor</u>
Servox Inton (n = 152)	56.9%	37.4%	4.9%	0.8%
Tru Tone (n = 8)	50.0%	37.5%	12.5%	0
Romet (n=7)	28.6%	71.4%	0%	0.8%
NuVois Model II (n=5)	20.0%	40.0%	20.0%	20.0%

Table 14.

Devices And The Percent of Reliability Ratings According to Speech-Language Pathologists

	<u>Excellent</u>	<u>Good</u>	<u>Fair</u>
TruTone (n = 52)	44.2%	50.0%	5.8%
Servox Inton (n = 194)	38.7%	54.1%	7.2%
NuVois Model II (n=28)	26.6%	64.3%	7.1%
Romet (n=48)	27.1%	60.4%	12.5%

Table 15.

Remaining Devices And The Reliability Ratings According to Speech Therapists

	<u>Excellent</u>	<u>Good</u>	<u>Fair</u>
Solatone (n = 9)	55.6%	33.3%	11.1%
Optivox (n = 17)	52.9%	35.3%	11.8%
NuVois Model I (n=15)	33.3%	66.7%	0
SPKR (n = 8)	25.0%	75.0%	0

When attempting to see if there are any significant differences between the groups in how they rate device reliability, results of the analysis reflect that the primary machine used and recommended is the Servox Inton. Beyond the Servox Inton, there are only three devices used by laryngectomees with more than 2 or 3 responses. These four devices were used in the analysis. Importantly, the small numbers for laryngectomees are noted by the investigator.

The investigator acknowledges that one of the restrictions on the use of Chi-Square requires that when a table is larger than 2 X 2, and more than 20% of the cells have expected frequencies of less than 5, or any cell has an expected frequency of 0, Chi-Square may not be appropriately used (Weinbach & Grinnell, 2001). While appropriate for the Servox Inton, Chi-Square is not appropriate for the NuVois II, Romet, and TruTone devices. As such, Table 16 reflects that more than 20% of the cells have expected frequencies less than 5. None of the Chi Square values are significant.

Table 16.

Observed and Expected Frequencies: Reliability Rating by Speech Pathologists and Laryngectomees for the NuVois II, Romet, and TruTone

Type of Respondent	NuVois Results (n=33)						Totals
	Excellent		Good		Fair/Poor		
	Observed	Expected	Observed	Expected	Observed	Expected	
SLP	8	(7.64)	18	(16.97)	2	(3.39)	28
LAR	1	(1.36)	2	(3.03)	2	(0.61)	5
Totals	9		20		4		33

$X^2 = 4.31, df = 2, p > .10$

Type of Respondent	Romet Results (n=56)						Totals
	Excellent		Good		Fair/Poor		
	Observed	Expected	Observed	Expected	Observed	Expected	
SLP	13	(12.86)	29	(29.14)	6	(6.00)	48
LAR	2	(2.14)	5	(4.86)	1	(1.00)	8
Totals	15		34		7		56

$X^2 = 0.016, df = 2, p > .10$

Type of Respondent	TruTone Results (n=60)						Totals
	Excellent		Good		Fair/Poor		
	Observed	Expected	Observed	Expected	Observed	Expected	
SLP	23	(23.4)	26	(25.13)	3	(3.47)	52
LAR	4	(3.6)	3	(3.87)	1	(0.53)	8
Totals	27		29		4		60

$X^2 = 0.75, df = 2, p > .10$

The results of the analysis for the Servox Inton however, indicate a significant difference in perceptions between therapists and laryngectomees. (See Table 17) More laryngectomees than expected rated the Servox Inton as excellent and fewer speech-language pathologists than expected did so.

Table 17.

Observed and Expected Frequencies: Reliability Rating by Speech Pathologists and Laryngectomees for the Servox Inton (n = 317)

Type of Respondent	Excellent		Good		Fair/Poor		Totals
	Observed	Expected	Observed	Expected	Observed	Expected	
SLP	75	(88.74)	105	(92.41)	14	(12.85)	194
LAR	70	(56.26)	46	(58.59)	7	(8.15)	123
Totals	145		151		21		317

$$X^2 = 10.17, df = 2, p < .01$$

Note: SLP = Speech-Language Pathologist; LAR = Laryngectomees