

West of England Medical Journal

Formerly Bristol Medico-Chirurgical Journal

WEMJ Volume 115 No.2 Article 1 June 2016



The e-journal of the
Bristol Medico-Chirurgical Society

A reflection on undertaking a qualitative follow-up study of professional performers following vocal-fold injury, and an experiential placement at NYU Langone Voice Center

Antonia Northam
Medical Student, University of Bristol

INTRODUCTION

The use of the upper feeding and respiratory tract for verbal communication developed only very late in the phylogenesis, and marks human beings as different from other living species.¹

In this phonocentric world it is hard to imagine life without speech. De Jong argues that such communication is the most 'existential act of man', allowing one to share meanings, artistic feelings and emotions with our environment.² Perhaps no one takes greater advantage of this ability than a professional performer. They convey their character's innermost thoughts and feelings to an audience through their posture, expressions, and voice and specmodulations.³ Their voice is a key tool – a tool that is put under much demand. A Broadway artist can be expected to perform six days a week, with more than one show a day. Their voices can be 'subject to hours of continuous singing, sometimes without aid of amplification, with expectations of reaching balcony listeners'.⁴ Arguably, over recent years expectations of audiences have soared too. As Dr Branksi of the NYU Langone Voice Center notes: "It used to be stand-and-sing. Now it's runjump-cartwheel-and-sing".⁵

Multiple studies have demonstrated that, by comparison to the general public, singers have increased symptoms of vocal disability and vocal complaints.^{6,7,8} For example, in a study of 529 singers, Phyland demonstrated that singers were twice as likely to report a voice issue than their non-singing counterparts.⁹ It has been argued that the increased vocal complaints of singers are consequent of the artist's keen awareness to vocal changes.¹⁰ Whilst it is conceivable that this contributes, there can be no denying that professional voice users* experience high vocal loading. Such tasks and demands, as well as

the already basic biologic and mental stress of everyday life, can interfere with the 'complex mechanism of vocal performance and acting'.¹

A key issue in understanding voice pathologies in professional performers is appreciating the 'subtle complexities' and 'exacting demands' that are placed upon their voice.¹² What may be a trivial problem for a non-singer can present huge issues for a singer whose livelihood depends on their ability to perform intricate vocal gymnastics.¹³ This is perhaps where their reputation as being 'the most demanding consumers of voice care'¹⁴ stems from – small perturbations in vocal quality or endurance are soon laid bare in a performance.⁴ Medical mismanagement, whilst feasibly inconsequential for speech, can be devastating for singers.⁷

A famous example of this devastation is that of Julie Andrews, whose vocal surgery resulted in the loss of her much loved singing voice and a medical malpractice lawsuit.¹⁵

Understandably, vocal cord damage is quoted as the singer's 'greatest fear';⁵ accordingly, it is vital that clinicians who work with singers are conscious of the sensitivity, attitudes and feelings they have towards vocal health and singing.¹³ An injury can impact their whole sense of well-being, even 'their very sense of self'.¹⁶ It is quoted frequently in the literature that there is a need to further address the psychological consequences of having an impaired voice^{1,7,12,13} and take steps to best prevent injury and its emotional sequelae: through education in vocal hygiene, alteration of false health beliefs, and the removal of barriers to

accessing good vocal care.¹⁷

Recognising this topic's importance, this project aimed to further explore the impact of vocal injury upon professional performers. As a performer myself, I was keen to seize the opportunity to see the fields of medicine and creative art merge in the work at the NYU Voice Center. Pursuing this SSC enabled me to study under doctors at a world-renowned Center of excellence, increase my exposure to the ENT specialty, and gain valuable research experience.

This essay will first describe my aims and objectives and give details of my clinical experiences. I will then explain the methodology and discuss the findings of my project. This consisted of compiling a case series, conducting a semi-structured interview, and sending out a qualitative survey.

CLINICAL AND RESEARCH EXPERIENCES

The SSC consisted of a three-week placement attached to NYU Langone Medical Center. A fellow student and myself were under the invitation of Dr Ryan Branksi and Dr Milan Amin.

We attended clinics at the Voice Center, sessions in the Operating Room, research meetings and sessions in the research laboratory. We also became involved in an ongoing piece of research: a systematic review of the role of the HPV vaccine as therapy. Furthering our exposure to the holistic needs of a performer, we also spent time at the Harkness Center for Dance Injuries. See Figure 1 for a handful of examples of such experiences.

* Defined as any person whose profession/livelihood relies on the use of their voice. According to Wellens there are two types of occupational voice loading:

(1) professions with high artistic demands such as actors/singers and

(2) professions with high short and long term load, such as in the military, coaches, lawyers, teachers.

For the purpose of this paper I will be focusing on the former. Wellens W, Opstal M, 'Performance Stress in Professional Voice Users', In Dejonckere P (Ed.), Occupational Voice: Care and Cure, The Hague: Kugler Publications, 2001 (p. 82)

Qualitative follow-up study of professional performers following vocal-fold injury

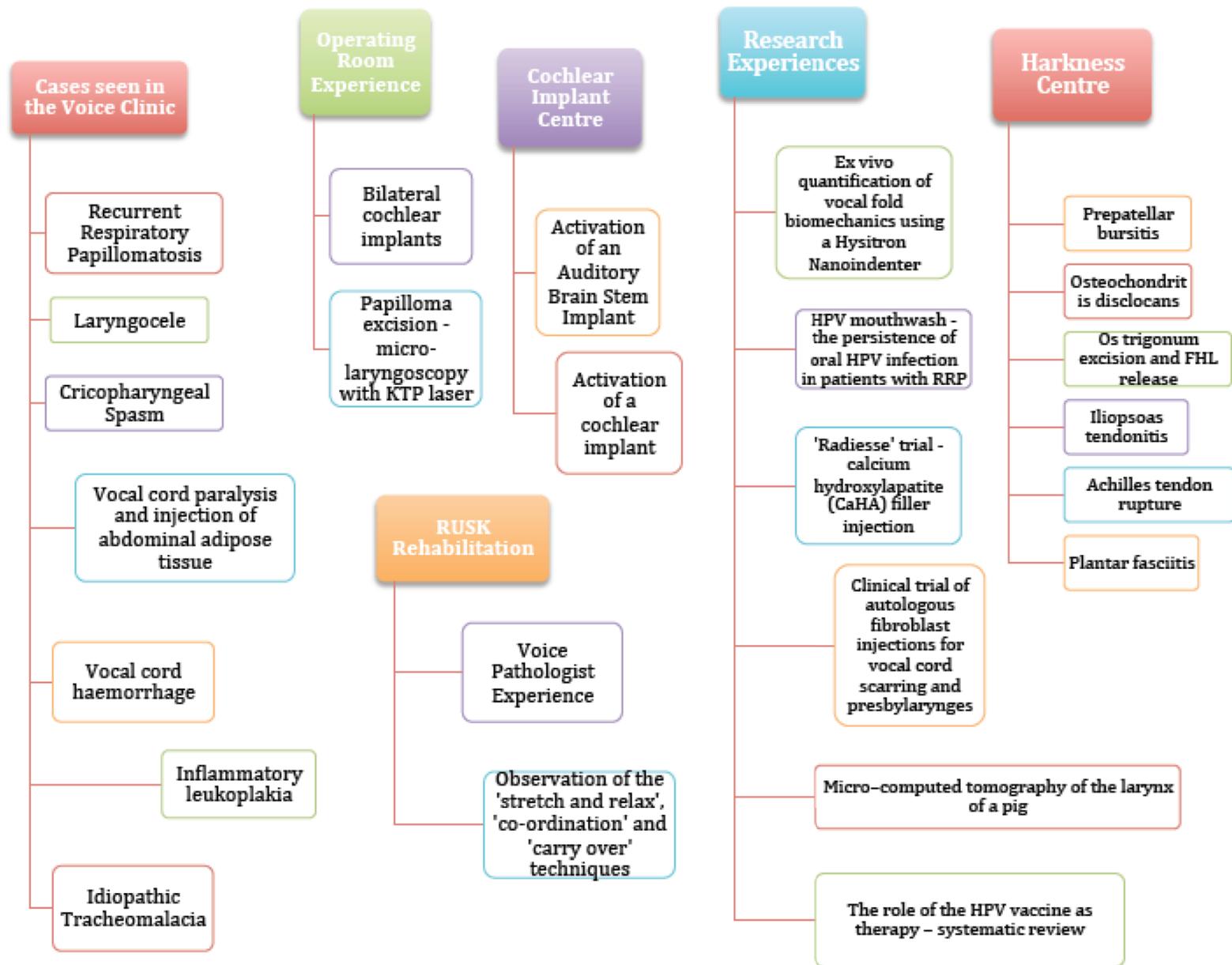


Figure 1: Some of the Experiences gained during the placement

METHODS

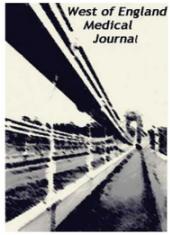
Our aim was to create a case series of professional performers who had experienced vocal injury. Ten of the most recent clinic attendees were selected whilst we were observing at the clinic. We obtained their medical history, casenotes, examination findings and the results of the self-completed questionnaires, from both their initial visit and most recent visit. Each one of the patients had consented for their anonymised information to be used for research purposes. Each patient was examined using Transnasal Fiberoptic Laryngoscopy with Stroboscopy (see Notes). This technique was combined with a recording camera, allowing us to revisit examinations and to further discuss the findings with the research fellows at the Center.

The patients also completed the Vocal

Handicap Index (VHI-10), Reflux Symptom Index (RSI) and Singing Voice Handicap Index (SVHI). These are questionnaires, completed at each consultation, allowing the physicians to assess the subjective impact of the symptoms that the patient is experiencing, and track their progress. The VHI-10 and SVHI-10 score consists of ten questions, each of which are statements that describe one's general voice and singing voice respectively, and the effect of it upon their life. Each statement can score a maximum severity of four points, giving a maximum score of forty. The RSI consists of nine questions, each of which scores a maximum severity of five points, giving a maximum score of forty.

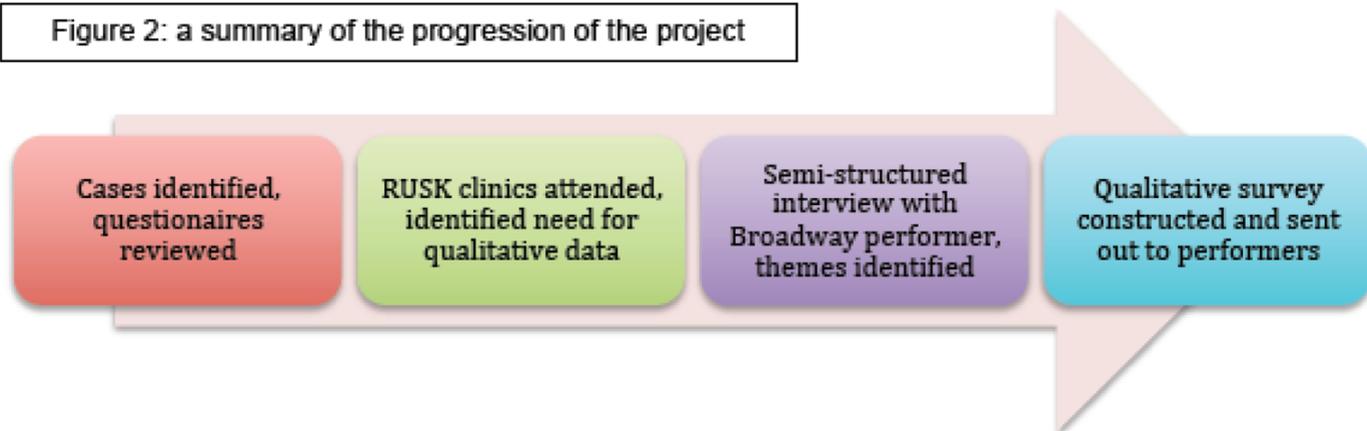
Although the VHI-10 was designed for use in the general population,¹⁸ Murray showed that unless statements related

specifically to singing are included, singers with voice injury do not rate their voices to be more affected than non-singers, supporting the validity of the VHI-10 in singers.¹⁹ The SVHI-10 was developed as a tool to assess voice function and quality, specifically in singers.²⁰ The RSI is also a validated method to evaluate laryngopharyngeal reflux with reliability.²¹ The analysis of these scores is given in the discussion. We observed that many of the patients annotated their questionnaires with additional information as to how their symptoms were impacting them. The questionnaire scores could not account for this additional information, and this we regarded as a limitation. Furthermore, when observing clinics at the RUSK Institute, we were struck by the prevailing challenge of dealing with the psychological impact of vocal injury. In order to further explore these



Qualitative follow-up study of professional performers following vocal-fold injury

Figure 2: a summary of the progression of the project



themes, we wished to obtain qualitative data, recognised as being the best way of gaining an in-depth understanding of human behaviour.²² Ideally, we would have used an iterative process to obtain a series of semi-structured interviews. Due to time and clinic constraints however, we were only able to obtain one such interview, with Mr X, a Broadway performer with an interest in vocal pathology and the health behaviours of performers. This interview allowed for the identification of themes and guided the twenty-four questions that made up our qualitative survey, which was sent out via a survey-monkey web-link to ten professional performers. Professional performers were defined as those for whom performing was either the source of their primary or secondary income, or who had received a formal degree or

training. Our question format was guided by work previously done by the RUSK Institute (a questionnaire based on the impact of raked staging). This guided us to use a colloquial, approachable voice in the questions rather than formal and passive one. We aimed to use a mixture of open-ended questions and also more specific, direct questions about the impact of the injury (for example on well-being, financial status, time taken off work etc). Having sent out the questionnaires to ten performers, one performer contacted the RUSK institute with the offer of posting the web-link to a wider database of performers. Consequently we are leaving the full analysis of results open in the aim of receiving between 20-30 responses, with the aim of a formal write-up of the results. Results presented here (of eight

responses, five of which are completed responses) represent the ongoing work. Ethical approval was sought for the survey; we were instructed, given the anonymised nature and the non-interventional method of the online survey, that no ethical approval was required. In the following section I will discuss the main findings from the case series, semi-structured interview and survey respectively.

RESULTS AND DISCUSSION

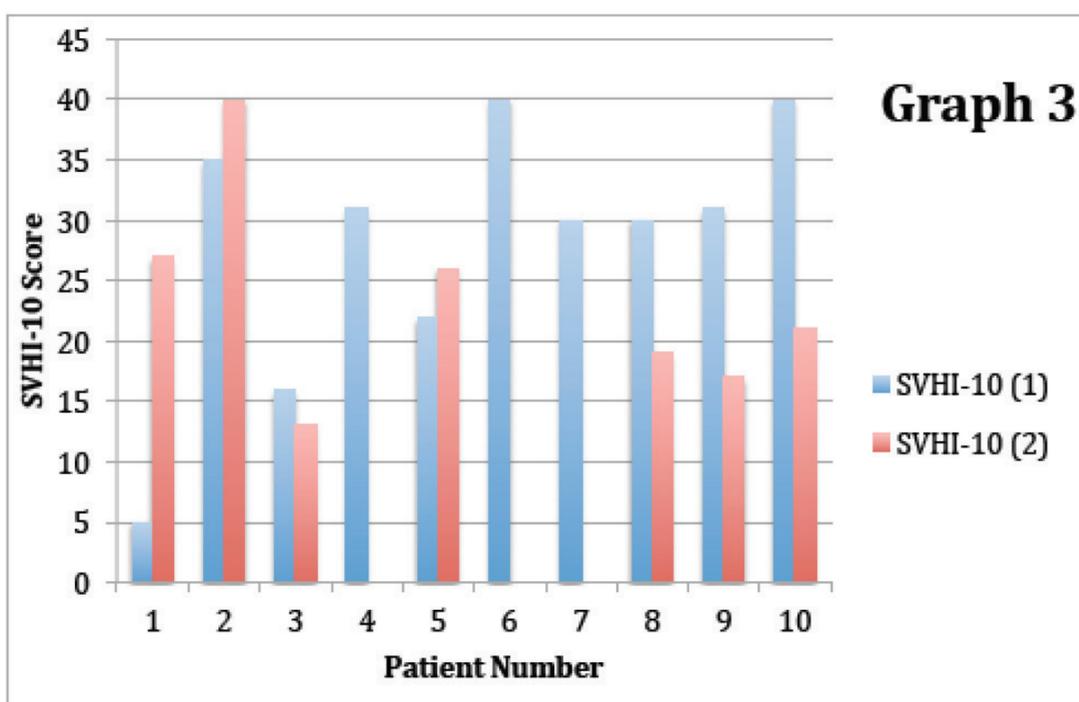
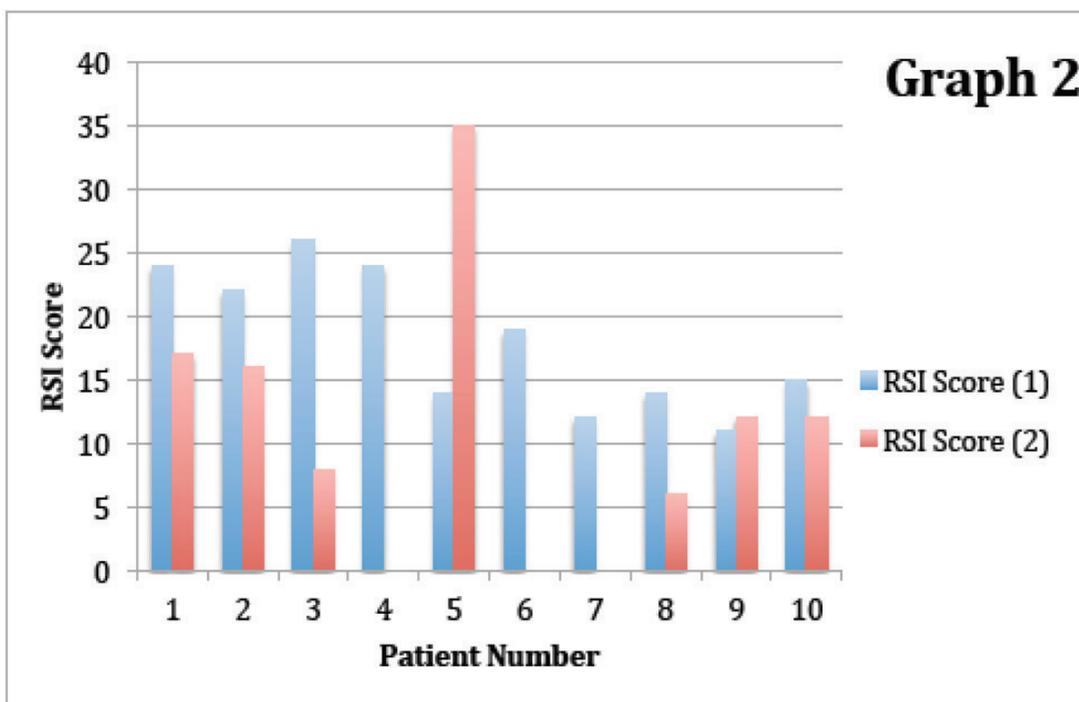
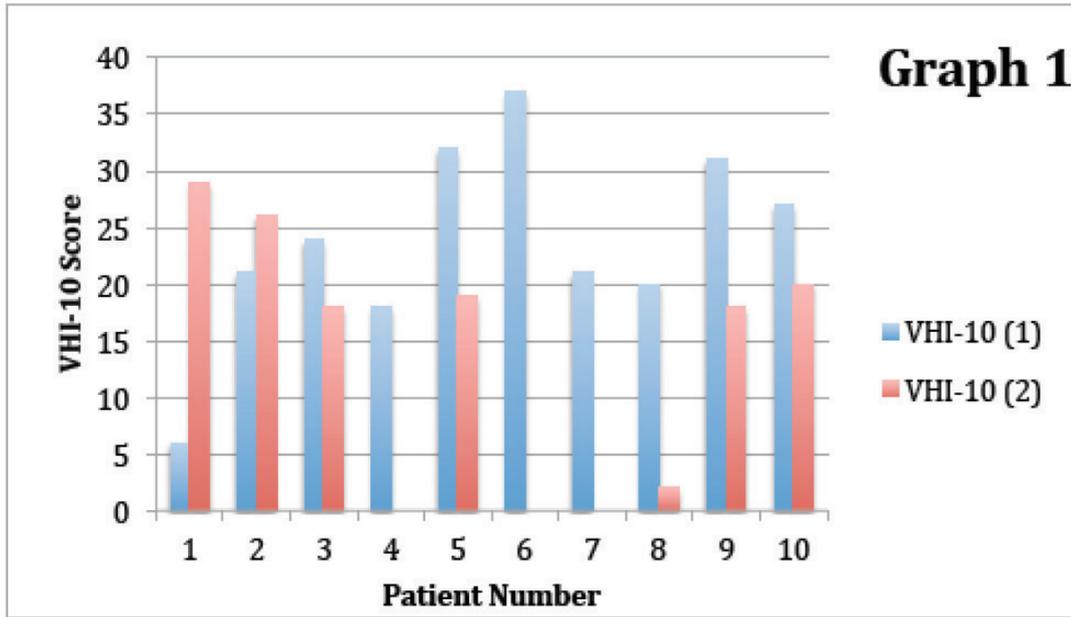
Case Series

As detailed in the methodology section, ten of the most recent clinic attendees were selected for the case series whilst we were observing at the clinic. Figure 3 below lists the injuries seen in this cohort; this group demonstrated some of pathologies known to be

Patient Number	Injury	VHI-10 Score 1	RSI Score 1	SVHI-10 Score 1	VHI-10 Score 2	RSI Score 2	SVHI-10 Score 2
1	Bilateral mid-membranous vocal fold oedema (phonotraumatic)	6	24	5	29	17	27
2	Bilateral vocal fold fibrosis/sulcus (phonotraumatic)	21	22	35	26	16	40
3	Bilateral vocal fold lesions	24	26	16	18	8	13
4	Lesion of true vocal cord	18	24	31	IN TRIAL: INFORMATION NOT AVAILABLE		
5	Lesion of vocal fold and vocal fold polyp	32	14	22	19	35	26
6	Vocal fold scar	37	19	40	IN TRIAL: INFORMATION NOT AVAILABLE		
7	Vocal fold polyp	21	12	30	IN TRIAL: INFORMATION NOT AVAILABLE		
8	Vocal fold lesion, haemorrhagic polyp	20	14	30	2	6	19
9	Lesion of vocal fold (primary injury)	31	11	31	18	12	17
10	Vocal fold scar (primary injury) and vocal fold atrophy	27	15	40	20	12	21

Figure 3. Tabulation of the patient's VHI-10, RSI and SVHI-10 score from their initial consultation '1' and the most recent '2', after having received either treatment or therapy. The score '2' is unavailable for patients 4, 6 and 7 as these patients were suitable for and enrolled into clinical trials after their initial consultation. The information is graphically represented in graphs 1, 2 and 3.

Qualitative follow-up study of professional performers following vocal-fold injury



Graphs 1, 2 and 3 Initial and most recent scores:
Vocal Handicap Index (VHI-10), Reflux Symptom Index (RSI) and Singing Voice Handicap Index (SVHI)

common amongst professional voice users.

As Franco writes, the following are often seen: *‘laryngopharyngeal reflux, muscle tension dysphonia, fibrovascular vocal fold lesions (eg, nodules and polyps), cysts, vocal fold scarring, changes in vocal fold mobility... Microvascular lesions and their associated sequelae of vocal fold hemorrhage and laryngitis due to voice overuse’*.¹⁶

For the purpose of this paper I will focus on the SVHI-10 scores.

SVHI-10 Scores:

As shown in Graph 3, four of the patients’ SVHI-10 scores decreased at their subsequent clinic visit. One would expect the score to decrease, reflecting success of therapy – this was supported by their clinical information. However, three of the patients’ SVHI-10 scores increased in their later visit. There are a few possible explanations for this. Firstly, the increased scores could simply reflect the natural clinical course of the pathology. It is possible that the patients have not responded well to treatment, or not adhered to advice regarding voice rest. Alternatively, the patients could have a motive for scoring their voices as affecting them severely – it could reflect wanting their condition to be taken seriously by the doctors, or in a hope of getting a particular treatment endorsed.

The influence of stress: Another explanation for the observed trends is that the patients are stressed and worried; from their clinical information, all three of these patients report this. Patient 1 ‘has been stressed and emotional recently due to some social issues’ and it has been recommended that she ‘see a psychologist about her anxiety issues as they relate to her voice’.

Patient 2 is also under pressure with ‘a “huge” performance scheduled with her CD release... She has concerns regarding her ability to perform successfully in her current voice’.

Patient 5 is also described as being ‘worried about her voice’. As mentioned



Qualitative follow-up study of professional performers following vocal-fold injury

in the introduction, psychological sequelae are common for singers with vocal injury.¹⁶

Yet in addition, the reverse is true - emotions and stress can also directly affect the voice.²³ Sataloff writes: *'The human voice is an exquisitely sensitive messenger of emotion... insecurity, depression, and other emotional disturbances are generally reflected in the voice'*.²⁴

It can thus be hypothesised that a vicious cycle can perpetuate - voice problem leading to anxiety leading to further problems and so forth. Equally, the high scores could reflect any stressors experienced that particular day. A limitation of this argument is that whilst it is true that these three patients have mentioned being stressed and worried in their consultations, there are patients whose scores decrease, yet who also report stress and anxiety.

The influence of reflux: It is also worth noting the possible influence of reflux on the trends observed. For example, patient 2, whose SVHI-10 score increased in the last consultation, has a history of 'impressive tobacco and alcohol use', and has been treated intermittently for Gastro-oesophageal reflux disease (GORD).

A reoccurrence of GORD could negatively affect her voice, through chronic arytenoid and vocal fold irritation by reflux of gastric juice.²⁴ However, this argument is limited as although the other patients do not have official diagnosis of GORD, notably, eight out of ten of the singers have an abnormal RSI scores at initial consultation (>13), indicating a strong possibility of laryngopharyngeal reflux.²¹ Whilst acid reflux has been estimated at 10-20% prevalence in the general population, twenty-five studies have shown higher rates in professional singers.²⁶⁻²⁷ It is hypothesised that this is due to *'rapidly fluctuating intra-abdominal pressures, relaxed esophageal sphincter tone, and disabling of the diaphragmatic sphincter'* and, in some cohorts, such as the Broadway singers studied by Gerhling et al., the high

prevalence of additional risk factors such as alcohol use, tobacco intake, coffee consumption, and late night eating.⁴

Limitations: It should be noted that there are limitations of representing the data in this way.

Clearly, the data set is incomplete due to patients 4,6 and 7 being enrolled in trials and therefore not completing the questionnaires on subsequent visits. This could have been improved upon by gathering clinical data from three other singers; unfortunately due to time limitations this was not possible. A further limitation is the discrepancy between the time passed between initial and most recent consultation for each of the patients. Whilst one can still describe the trend of scores, as all patients received some type of treatment/therapy, this should be considered when interpreting the figures. An improvement would be to gather the scores of all of the clinical visits of each of the patients and plot how they change against time. Furthermore, whilst the first score represents the first time the patients attended NYU Voice Center, it cannot be assumed that this is prior to having any treatment/therapy, as the patient could have previously attended a clinic elsewhere.

Additionally, whilst the scoring indexes have been validated, we should still question if the scores reflect the underlying pathology. Through assessing the clinical picture and examinations, one can see that these findings are not necessarily reflected in the score. This is of course true of many diseases; the patient's subjective experience of the symptoms is not neatly correlated to pathology. There is more to the disease than just the pathology visible.

As Sataloff writes, despite the technological advances in laryngoscopic examination, *'judging voice ranges, quality, or other vocal attributes by inspection of the vocal cords is not possible'*.²⁸

This point also calls us to question

how accurately even 'healthy' singers can accurately assess the state of their own voice. Studies have shown a higher presence of observable laryngeal pathology than expected in professional singers who identified as being 'healthy',^{18,29} it being argued that *'professional singers do not appear to have a strong ability to evaluate their vocal health as defined by their assessment of vocal function using the SVHI'*.¹⁸

This said, it remains uncertain if the SVHI or laryngeal examination is a better determinant of true vocal health, and what may be 'normal' for one performer may be 'abnormal' for the other.¹⁸ Further research could explore this question, and investigate the benefits of screening 'healthy' singers for early signs of pathology.

Considering that many of the patients annotated their questionnaires with additional information as to how their symptoms were impacting them, we progressed onto collecting qualitative data.

Semi-Structured Interview

We conducted a semi-structured interview with a Broadway singer (Mr X), who had experienced vocal hemorrhage and mid-cord thickening, requiring him to break from singing between Autumn 2010 - Summer 2011. In this period of time he developed an interest in vocal pathology and conducted research into behaviours of Broadway performers. Whilst it could be argued that the wider applicability of his opinions is limited by this interest, he has an awareness of others' opinions in the industry and this interview served as a springboard for the types of questions employed in the survey. Ideally, we would have conducted further interviews using an iterative process until the point of data saturation, specifically seeking deviant cases to maximise external validity. Many topics emerged from the interview, including common misconceptions held about vocal injury, engagement in vocally damaging



Qualitative follow-up study of professional performers following vocal-fold injury

behaviour, and differences in training and advice given. For the purpose of this essay, which is specifically exploring the impact of injury itself, I will focus on three themes:

- psychological impact,
- secrecy, and
- finance/insurance issues.

Representative quotes from Mr X are shown below.

I'm thinking oh my god I'm done I'm done that's it! What, will it get better in 2 years?! I mean what do I do in the meantime?

A huge wake up call that something can be so fleeting and isn't always there

Emotionally it was really hard because I felt a little at sea I felt like at what point do I let this go

It was hard as I was getting calls for jobs and shows and I was having to say no I can't I am busy or I have too much stuff going on. Because you don't want people to know you are injured, it's a strange thing... You want to seem as ready as possible

The way workmen's compensation and system works in States, have to fill out specific form for injury... If I am singing in the show and I wake up the next morning and I have no voice you can't fill out a form that says the exact time that injury took place... you don't know. And often it's not one specific injury its an accumulation, repetitive motion... and then you have to figure out a way to say it's a work related injury when no documentation says it is, it's a grey area. It's a struggle to claim that.

Psychological Impact:

Mr X spoke of emotional difficulties, feeling somewhat in limbo when he sustained an injury.

It made him consider other possible options and realise that his career was not something that would necessarily sustain itself forever. In this case, he was fortunate to regain his ability to sing, but developed an interest in medicine and has enrolled in a pre-med programme.

Secrecy

A theme that emerged was avoiding telling people he was injured, due to the possible impact it could have upon his career in the future.

Financial Impact / Insurance Issues:

Whilst Mr X was fortunate not to have financial issues during this time due to

support, he identified that insurance claims can be challenging due to the nature of a vocal injury being harder to 'pin down' than a physical injury- 'voice disorders are not accepted as an occupational disease'.^{23'}

Using the themes that emerged in this interview, we constructed a qualitative survey.

Psychological Impact:

Having researched the literature, it was anticipated that we would find that performers found sustaining an injury emotionally challenging.

These findings are supported by other authors' exploration into such impact. Sapir conducted a questionnaire-based study comparing singers to non-singers and found that, despite there being no significant differences between the two groups with regards to general affective/dysphoric tendencies, there were dramatic differences when asked about feelings towards their voice. 63% of the singers reported at least one negative feeling (frustrated, anxious, worried, depressed or bothered) compared to 8% of the non-singers. Singers were found to be 'psychologically taxed... highly sensitive and apprehensive about their voice and vocal health'.¹³ Sataloff writes that as the voice of a singer is so intrinsic to their sense of selfidentity, recovery after vocal injury and surgery can be particularly challenging: 'the impact is extraordinarily anxiety-producing in professional voice users. Even temporary periods of absolute restriction may lead to feelings insecurity, helplessness, and dissociation from the verbal world'.³⁰

SURVEY

So far we have received eight responses to this survey (5 completed).

Characteristics of the performers and their injuries are shown in figure 4.

Sex	Male: 14.29% (1) Female: 85.71% (6)
Age	25 to 34: 62.50% (5) 35 to 44: 25.00% (2) 45 to 54: 12.50% (1)
Profession	Actor: 14.29% (1) Singer- Musical Theatre: 28.57% (2) Other (please specify) 62.50% (5) (Jazz Singer/Piano teacher, Actor/singer/voice teacher, Musical Theatre/Voice Teacher, Voice Over Artist, Singer-songwriter)
Injury (as described)	- Loss of range: felt like vocal cords collapsing - Inability to sustain pitches, wavering pitch, rattling, feeling of pulling in the neck - First diagnosed with pseudo-cyst, during surgery discovered scar tissue under the epithelial layer - I discovered that I had a 'lesion' a little over a year ago, but I had always had voice problems in the past (hoarseness, vocal fatigue, etc.) - Originally my first doctor thought it was a polyp (which had hemorrhaged), but later on my current doctor discovered that it was some sort of scar that had become worse. Could have had the scar since childhood. - Polyp on vocal cord

Figure 4. Characteristics of the performers and their injuries



West of England Medical Journal

Formerly Bristol Medico-Chirurgical Journal
WEMJ Volume 115 No.2 Article 1 June 2016



The e-journal of the
Bristol Medico-Chirurgical Society

Qualitative follow-up study of professional performers following vocal-fold injury

Psychological Impact (continued)

It had a huge impact on my life. I am less social now... I am now a bit paranoid as well about re-injury

Upset me, singing is part of my identity. Not being able to sing as I used to is frustrating and I miss it.

Less confidence

Bleak

Anxious, worry when things will get back to normal

It made it difficult to work, which caused loss of income and definitely was emotionally difficult at times

The anxiety about performance came from lack of predictability in my voice. There were definitely times when I felt depressed about the limits it placed on me as a performer

Secrecy:

Some people felt that they could tell people about their injury, but others felt that they should keep it to themselves, mostly for reasons related to career progression.

Yes, I was concerned about the long term. Will they be worried about hiring me because I have gone through this? I have only told a select group of people.

I feel concerned only about telling people in charge of giving me work. There's a stigma.

At first I did but I guess I then got pretty open about it. Maybe too open? I don't see why I should hide it.

I was concerned about telling managers as I thought they may not think my voice issues are truly a "medical" problem

Financial Impact / Insurance Issues:

The responses regarding financial implications were mixed; some had a secondary source of income to fall back on (which in some cases was teaching, still proving to be strenuous on the voice) and others had missed the main audition season and were more concerned. With regards to insurance, one performer had had a challenging experience:

Because I was injured while working I was able to receive workers compensation. I did not make my weeks through the union so I pay for my health care through Obamacare. That insurance did not work in the state I was working in. NY State does not offer PPO plans. I didn't realize my health care did not work outside of the New York Tri-state area

Another offered this advice:

Vocal Injuries seem to be non-existent for worker compensation claims. I think an effort to get them to understand the needs of this type of injury are important. Know as much as you can about your insurance and your union. Be cautious and don't be afraid to see someone early on.

This highlights the challenge of obtaining healthcare in a system with complex insurance issues to navigate, and illustrates the difference between the US and UK health systems.

Shockingly, Gilman demonstrated in a study of 78 singers that 39% would not seek medical care for their voice problems due to insurance issues, concluding that lack of health care coverage and lack of awareness about services available are among major barriers to seeking care.³¹

CONCLUSION

The professional performer utilises the 'existential act' of vocal communication to help an audience suspend their disbelief and step into the world of an on-stage character.² In doing so, 'exacting demands' are placed upon their voice,¹² and, given that their careers can be at stake when an injury is sustained, we should perhaps forgive them for being 'the most demanding consumers of voice care'.¹⁴ This project aimed to further explore the impact that a vocal injury has upon a performer. Firstly, a case series was compiled, where the SVHI-10 scores - a method of assessing the subjective impairment on singing - were analysed. We recognised, from annotations scribbled on the questionnaires and experience within clinics, that in-depth qualitative data was needed for greater insight into this topic. The qualitative methods of a semi-structured interview and survey were employed, and the themes of psychological impact, the need for secrecy given the career implications, and financial/insurance issues were studied. Our conclusions were similar to those echoed in the literature; a vocal injury can be 'devastating' for performers,⁷ impacting their ability to work, financial security, overall sense of well-being and even their very sense of self.¹⁶ These findings point towards a need for greater psychological support for performers who sustain injury. Additionally, it is necessary to identify and remove barriers to the access of good vocal care, such as insurance issues, so as to best prevent the devastating sequelae of vocal injury.

REFLECTION

As a performer myself, the opportunity to see the fields of art and medicine merge in the work at the NYU Voice Center and Harkness Center for Dance Injuries was one I wished to seize. I have an appreciation of the physical toll that performing takes on one's body and voice, and wanted to further my understanding of the importance of effective and evidence-based therapy



West of England Medical Journal

Formerly Bristol Medico-Chirurgical Journal
WEMJ Volume 115 No.2 Article 1 June 2016



The e-journal of the
Bristol Medico-Chirurgical Society

Qualitative follow-up study of professional performers following vocal-fold injury

and rehabilitation. The project required planning from early January, involving lengthy paperwork procedures with occupational health and immigration. Consequently it was an invaluable experience in terms of designing an original project, furthering my independent learning and organisational skills. As ENT is a specialty of great interest to me, it was invaluable to further my exposure to it, especially in a Center of excellence where exciting cutting-edge research is underway. It was challenging to plan what project we were going to do from a distance, not knowing exactly what the clinic set-up was, nor how easy it was going to be to talk with patients ourselves rather than just observe. Consequently, we had to adapt the scope of our project as the placement progressed. This could have been improved with greater planning of the initial stages, although it was a strength that we adapted to hurdles as they were encountered. We were limited by time constraints and the survey lacks power due to the small number of responders; this is the reasoning for leaving the survey open with the aim of gathering more data. Having only had experience of the NHS, it was fascinating to see how a different health care system operates. I was struck by how the practice has a business-like and service-orientated feel; the Voice Center is located within what looks like a hotel, and the hospital's branding and advertisements are scattered around the city. I recognised some of the systems' shortcomings – it was heartbreaking to see patients declining treatment due to insurance issues and left me feeling proud of the NHS and its free-at-the-point-of-access mantra. This said, lessons can most definitely be taken from the US. Without fail, the doctors were engaging, passionate and interested in all of their patients. I felt that this is contributed to by the fact that patients choose and rate their doctors, and the competition of the healthcare market. There is no room to rest on one laurel's. Just as waiters in American restaurants know how to deliver good service, so do doctors!

ACKNOWLEDGEMENTS

With kind thanks to the NYU Voice Center for hosting us – particularly Dr Ryan Brankski, Dr Milan Amin, Dr Gregory Dion, Dr Thomas Roland, and Sherley Gherson. The learning opportunity was invaluable and highly inspiring. Many thanks to those at Harkness, in particular to Dr Donald Rose; the center is a fine example of charitable support and is invaluable for the performing population. Thank you to the SWLA for the travel grant, making the whole trip possible. Finally, thank you to Dr Angus Waddell, for his unending enthusiasm, encouragement and support with this endeavor.

NOTES: STROBOSCOPY

For details of the Stroboscopy technique see Sataloff R¹². He argues that stroboscopy *'is the single most important technologic advance in diagnostic laryngology'* as it allows *'routine slow-motion evaluation of the mucosal cover layer of the leading edge of the vocal fold... permit[ing] detection of vibratory asymmetries, structural abnormalities, small masses, sub mucosal scars, and other conditions that are invisible under ordinary light'*.

REFERENCES

- Wellens W, Opstal M, 'Performance Stress in Professional Voice Users', in Dejonckere P (Ed.), Occupational Voice: Care and Cure, The Hague: Kugler Publications, 2001 (p. 81)
- De Jong F, Kooijam P, Orr R, 'Predictive Parameters in Occupational Dysphonia: Myth or Reality?' in Dejonckere P (Ed.), Occupational Voice: Care and Cure, The Hague: Kugler Publications, 2001 (p. 101)
- Wellens W, Opstal M, 'Performance Stress in Professional Voice Users', in Dejonckere P (Ed.), Occupational Voice: Care and Cure, The Hague: Kugler Publications, 2001 (p. 93)
- Gehling D, Sridharan S, Fritz M, 'Backstage at Broadway: a demographic study', J Voice 2014; 28(3): 311-5
- NYU Langone Medical Centre, 'The Role of a Lifetime', News & Reviews [Online] March/April 2012. Available from: http://nyulangone.org/files/publication_issues/49951_March_April.pdf Accessed 25/07/15
- Miller M, Verdolini K, 'Frequency and risk factors for voice problems in teachers of singing and control subjects', J Voice 1995; 9:348-362
- Sapir S, 'Vocal attrition in voice students: survey findings', J Voice 1993; 7: 69-74
- Tepe S. et al. 'A pilot survey of vocal health in young singers', J Voice 2002; 16: 244-250
- Phyland D, Oates J, Greenwood K, 'Self-reported voice problems among three groups of professional singers', Journal of Voice 1999; 13: 602-611
- Kitch J, Oates J, 'The perceptual features of vocal fatigue as self-reported by a group of actors and singers', J Voice 1994; 8: 207-214

- Wellens W, Opstal M, 'Performance Stress in Professional Voice Users', in Dejonckere P (Ed.), Occupational Voice: Care and Cure, The Hague: Kugler Publications, 2001 (p. 82)
- Sataloff R, 'The professional voice', Otolaryngology-Head and Neck Surgery 1991; 3:2029-2056 (p. 1)
- Sapir S, Mathers-Schmidt B, Larson GW, 'Singers' and non-singers' vocal health, vocal behaviours, and attitudes towards voice and singing: indirect findings from a questionnaire', Eur J Disord Commun. 1996; 31(2): 193-209
- Rosen D, Heuer R, Levy S et al., 'Psychological Aspects of Voice Disorders', in Sataloff R (Ed.) Vocal Health and Pedagogy, Volume II: Advanced Assessment and Treatment. San Diego: Plural Publishing, 2006 (p.162)
- Moyer J, 'How Julie Andrews's voice was stolen by a medical disaster', The Washington Post [Online] 19/03/15. Available at <http://www.washingtonpost.com/news/morningmix/wp/2015/03/19/how-julie-andrewss-voice-was-stolen-by-a-medical-disaster/> Accessed 01/08/15
- Franco R, Andrus J, 'Common diagnoses and treatments in professional voice users', Otolaryngol Clin North Am. 2007; 40(5): 1025-61
- Donahue E, Leborgne W, Brehm S, et al., 'Reported vocal habits of first-year undergraduate musical theater majors in a preprofessional training program: a 10-year retrospective study', J Voice 2014; 28(3):316-23
- Castelblanco L, Habib M, Stein D, et al., 'Singing voice handicap and videostroboscopy in healthy professional singers', J Voice. 2014; 28(5): 608-13
- Murry T, Zschommler A, Prokop J, 'Voice handicap in singers.', J Voice 2009; 23(3): 376-9
- Cohen S, Jacobson B, Garrett C, et al. 'Creation and validation of the singing voice handicap index', Ann Otol Rhinol Laryngol. 2007; 116: 402-406
- Belafsky P, Postma G, Koufman J, et al. 'Validity and reliability of the reflux symptom index (RSI)' J Voice 2002; 16:274-7
- Miles, B, Huberman A. Qualitative Data Analysis: An Expanded Sourcebook. California: SAGE Publications, 2004.
- De Jong F, Kooijam P, Orr R, 'Predictive Parameters in Occupational Dysphonia: Myth or Reality?' in Dejonckere P (Ed.), Occupational Voice: Care and Cure, The Hague: Kugler Publications, 2001 (p. 108)
- Sataloff R, 'The professional voice', Otolaryngology-Head and Neck Surgery 1991; 3:2029-2056, (pp. 10-11)
- Dent J, El-Serag, H, Wallander M et al., 'Epidemiology of gastro-oesophageal reflux disease: a systematic review', Gut 2004; 54: 710-717
- Pregun, I. et al. 'Gastroesophageal reflux disease: work-related disease?' Dig Dis 2009; 27: 38-44
- Cammarota G. et al., 'Reflux symptoms in professional opera choristers', Gastroenterology 2007; 132: 890-898
- Sataloff R, 'The professional voice', Otolaryngology-Head and Neck Surgery 1991; 3:2029-2056, (p. 17)
- Elias M, Sataloff R, Rosen D, et al., 'Normal stroboscopy: variability in healthy singers', J Voice 1997; 11:104-107
- Rosen D, Heuer R, Levy S et al., 'Psychological Aspects of Voice Disorders', in Sataloff R (Ed.) Vocal Health and Pedagogy, Volume II: Advanced Assessment and Treatment. San Diego: Plural Publishing, 2006 (p.172)
- Gilman M, Merati A, Klein A, 'Performer's attitudes toward seeking health care for voice issues: understanding the barriers', J Voice 2009; 23(2): 225-8