# Trends in music preferences of patients undergoing routine cataract surgery

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## Abstract

This study examined music preferences among 272 patients undergoing awake cataract surgery at the Wye Clinic over eight months. Patients were asked about their preferred music, and responses were categorised with input from professional musicians. Classical music was the most requested genre (28.7%), followed by "anything" (11%), jazz (8.5%), pop (7.7%), and rock (7.4%). Results suggest most patients appreciate the opportunity to choose music, enabling a sense of control and enhancing their surgical experience. These findings support incorporating patient-selected music into surgical care to improve comfort and satisfaction.

**Keywords: Cataract Surgery, Music, Patient choice.**

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## Introduction

Music therapy is "the professional use of music and its elements as an intervention in (a) medical… environment with individuals… who seek to optimize their quality of life…" [1]. In the absence of a qualified music therapist, the music used as a passive environmental adjunct during surgery is considered a form of receptive music therapy [2].

When used as a complement to the operative journey, music consistently demonstrates a matrix of positive effects. Psychologically, there are associated reductions in perioperative and postoperative levels of subjective pain and psychological distress measured using the Hospital Anxiety and Depression Scale (HADS) and the EuroQol 5-dimension 3-level test (EQ-5D-3L) [3,4]. There may be a counteraction of the feelings of helplessness and hopelessness that come with the emotional burden of being in hospital [5]. Physiologically, patients benefit from an associated reduction in systolic blood pressure and heart rate, which has been reported within an ophthalmic surgical setting, among other surgical settings, including elective gynaecological surgery [3,6,7,8,9]. These effects exist for elderly patients, and are not significantly affected by medically treated hypertension [10]. In particular, patients who tend towards hypertension during acute stress may benefit more from music therapy in a surgical setting than normotensive patients [11].

An array of positive effects is demonstrated from using music as a complement to ophthalmological procedures. For example, playing Mozart to patients immediately prior to automated perimetry is associated with reductions in fixation losses, false positives and negatives, and test duration [12]. There is an associated reduction with the surgical challenges of head drift and eye movement during awake cataract surgery [13]. Despite the large body of literature examining the value of music within surgery, a relatively small number of papers investigate its value in ophthalmic procedures. This work aims to identify what music patients undergoing awake cataract surgery actually want to listen to. As the use of a general anaesthetic is now uncommon practice in routine cataract surgery, the value of non-invasive measures such as music, with the potential for reductions in the psychophysiological stress evoked by having surgery, hold importance.

## Methods

Data was collected from 272 consecutive routine cataract (phacoemulsification with intraocular lens implantation) surgeries (all under topical anaesthesia) over an eight-month period, using a simple form (see Supplementary information - .docx file). This collected simple anonymised patient demographic data, alongside expressed music preferences after being asked the open question of what patients would like to listen to for the duration of their cataract surgery. Responses were initially grouped into five broad categories:

1. 'Specific genre'
2. 'Specific era'
3. 'Other'
4. 'Surgeon's preference'
5. 'Wanted no music'

After data collection, group frequencies were recorded, and the 'Other' category was sub-grouped into genres. The advice of two professional musicians was sought at this stage. Descriptive data analysis was conducted in R (4.2.3, packages: ggplot2, dplyr, broom and stringr) [14,15,16,17,18]. Note, NHS REC was not required, as this project is not research according to the NHS HRA decision tool.

## Results

In total, data relating to patients' music choices during 272 routine phacoemulsification procedures were collected. Patient ages followed a normal distribution between the range of 34-94 years with mean of 74.9 (8.9). There were 147 females and 105 males (20 had no recorded sex).

During the eight months of data collection, 265 of 272 (97.4%) of patients undergoing routine cataract surgery did want to listen to music during their time in theatre. Of the 7 (2.6%) who did not want to listen to music, two were deaf. Of the 265, 117 (43.0%) made a specific request, which referred to a specific instrument/ artist/ song, etc. Specific requests were subcategorised by genre, and a comprehensive breakdown is shown in Table 1. 88 (32.4%) requested a specific genre, and these are shown in Table 2. 37 (13.6%) made vague requests, which included the statements shown in Table 3. 17 (6.3%) asked for the surgeon's preference to be played, and seven

**Table 1** Genres of specific requests (117 requests in total).

| Genre | Count (% of 117) |
|---|---|
| *Pop* | 19 (16.2) |
| *Rock* | 17 (14.5) |
| *Baroque* | 13 (11.1) |
| *Classical* | 13 (11.1) |
| *Easy listening* | 12 (10.3) |
| *Mainstream jazz* | 9 (7.7) |
| Romantic modern | 9 (7.7) |
| Romantic | 7 (6.0) |
| Folk | 5 (4.3) |
| *Soul* | 5 (4.3) |
| Blues | 5 (4.3) |
| Instrumental | 4 (3.4) |
| Classical romantic | 3 (2.6) |
| Modern | 3 (2.6) |
| Big band | 3 (2.6) |
| *Traditional jazz* | 2 (1.7) |
| *Jazz fusion* | 2 (1.7) |
| *Country* | 2 (1.7) |
| World | 2 (1.7) |
| *Classical opera* | 1 (0.9) |
| Choir | 1 (0.9) |
| *Bebop jazz* | 1 (0.9) |
| *Modern jazz* | 1 (0.9) |
| Rhythm and blues | 1 (0.9) |
| *Progressive rock* | 1 (0.9) |
| Dance | 1 (0.9) |
| Electronic/ trance | 1 (0.9) |

Table 1 shows the raw counts and associated proportions for the genres of different specific requests, made by those in the sample who made specific requests.

(2.6%) requested a particular era of music, which is shown in Table 4. Where there are overlaps between how patients' requests were grouped, this data is combined in Table 5 (overlapping subcategories are italicised in Tables 1-4).

## Discussion

The data suggest that the most patients undergoing routine awake cataract surgery do want to listen to music while in theatre. The top five most popular requests were classical music (28.7% of the total sample), 'anything' (11%), jazz (8.5%), pop (7.7%) and rock (7.4%). The categorisation of genres was conducted with two professional musicians of different backgrounds (romantic-modern, and jazz). There is a general tendency to group together similar genres with classical music. For example, baroque, modern and more broadly, instrumental, may be grouped together erroneously under the heading of classical. Similarly, jazz artists from the requests were broken down into five distinct sub-genres: mainstream jazz, traditional jazz, bebop jazz, modern jazz and jazz fusion. Of note, two

**Table 2** Requests for genres (88 requests in total).

| Genre | Count (% of 88), where relevant, sub-requests with associated counts are specified |
|---|---|
| Classical | 65 (73.9)<br>Gentle 14<br>Light 3<br>Piano 2<br>Relaxing 1<br>Soothing 1 |
| Jazz | 8 (9.1)<br>Soft 2<br>Traditional 1 |
| Country, or Country and Western | 3 (3.4)<br>American 1 |
| Rock | 2 (2.3)<br>Hard 1 |
| *Baroque* | 2 (2.3) |
| *Easy listening* | 2 (2.3) |
| *Opera* | 1 (1.1) |
| Doo-wop | 1 (1.1) |
| Elevator music | 1 (1.1) |
| Military music | 1 (1.1) |
| *Pop* | 1 (1.1) |
| Reiki music | 1 (1.1) |
| *Soul* | 1 (1.1) |

Table 2 shows the raw counts and associated proportions for different genres, from those in the sample who requested specific genres.

**Table 3** Vague requests (37 requests in total).

| Vague request | Count (% of 37) |
|---|---|
| Anything | 30 (81.1) |
| Something relaxing | 2 (5.4) |
| Gentle, not rock | 1 (2.7) |
| As little as possible | 1 (2.7) |
| Anything, older stuff | 1 (2.7) |
| Anything relaxing | 1 (2.7) |
| Anything but jazz or heavy metal | 1 (2.7) |

Table 3 shows the raw counts and associated proportions for different vague statements, from those in the sample who requested music vaguely.

**Table 4** Requests for particular eras (7 requests in total).

| Era | Count (% of 7) |
|---|---|
| 60s | 4 (57.1) |
| 80s | 2 (28.6) |
| 90s | 1 (14.3) |

Table 4 shows the raw counts and associated proportions for different eras, from those in the sample who requested music by specifying an era.

**Table 5** Combined data for overlapping categories.

| Overlapping genre | Count (% of total sample, 272) |
|---|---|
| Classical | 78 (28.7) |
| Jazz (including mainstream jazz, traditional jazz, jazz fusion, bebop jazz and modern jazz) | 23 (8.5) |
| Pop | 21 (7.7) |
| Rock (including progressive rock) | 20 (7.4) |
| Baroque | 15 (5.5) |
| Easy listening | 14 (5.1) |
| Soul | 6 (2.2) |
| Country, or Country and Western | 5 (1.8) |
| Opera (including classical opera) | 2 (0.7) |

Table 5 shows the raw counts and associated proportions of the total sample for sub-categories that were overlapping in other groups (which can be identified in Tables 1-4).

patients requested Classic FM, which were not included in the overall 'classical' genre, as Classic FM plays a range of genres. Also note that calculated total counts from the tables may be higher than expected, as some requests fitted into more than one genre, and a small minority of patients requested more than one category, e.g. '90s pop'. Specific requests were classified by genre (Table 1), because this was the most useful approach for data integration (Table 5). Alternative approaches to music categorisation could focus on specific musical elements such as the tempo of the songs played, or the instrumental/vocal focus, etc., though the data collected here does not facilitate this type of evaluation.

This study deliberately does not focus on any anxiolytic or other psychophysiological effect that music has on cataract surgery patients. This is well-established already, and patients at the Wye Clinic often receive diazepam prior to surgery, so there would be low power in this setting to examine any anxiolytic effect of music. The sample size of 272 cataract surgeries, across the time-span of eight months suggests high internal validity of painting a reasonable picture of what music choices patients make when undergoing routine awake cataract surgery. This data was collected from a single private clinic, and generalisability to different geographical locations should be considered carefully.

## *The effect of choice*

The importance of being specific with the categorisation of patients' music choices arises when considering the array of effects that music may have on them. Though on the surface, the perceived effect of highly different requests, such as progressive rock compared to light classical may be contrasting, Hole et al reported no significant differences between genres on outcomes including post-operative pain, analgesia use or length of stay after surgery [4]. Interestingly, they also found no significant differences between patients having the choice of music played versus not having the choice. In contrast, Tan et al found that in a surgical setting, patients generally prefer to make their own choices of music [3]. This is supported by the data in this paper. Patients' mental states, personality traits and individual temperaments may be important factors that influence their psychophysiological responses to music [19]. The psychological elements implicated in music's positive role in elective awake surgery include an internalising of locus of control, and self-efficacy through playing an active role in the imposition of a more relaxed physiological state [20,21]. Drawing this together, the actual choice of music may not be as important as the patient making the choice, given that genres that evoke a relaxed physiological state are likely to differ at least slightly between individuals.

## *Emotional state*

Though much of the literature in this area present correlations between music and positive effects seen in patients as causational, listening to music is associated with limbic system alterations [22,23]. Stefano et al, found a statistically significant decrease in IL-6 (proinflammatory), and suggested that more plasma morphine was converted to morphine-6-glucuronide, indicating a potential physiological basis for decreased blood pressure from listening to music [24]. Endogenous opiates (endorphins) are likely to be involved in the psychophysiologically euphorigenic effects of music [25]. Furthermore, individuals listening to music specifically chosen for pleasure is accompanied by a measurable increase in dopaminergic activity within the mesolimbic reward system [26].

Additionally, with lower order processing, the stimuli provided by musical elements elicit psychophysiological responses rooted in enhancing or minimising states of arousal, including responses in arousal state to concurrent stimuli, such as the possible perceived threats in an operating environment. Beyond this, the contextual associations with music – for example, with different genres – that arise from higher order processing, interact with how these psychophysiological responses occur. For a patient, the experience of awake surgery is likely to be a sequence of somewhat unexpected events. The deliberate use of music may provide an auditory object that is predictable to the patient, particularly if the song, artist or genre was chosen by them because of their familiarity with it. In doing so, the heightened sense of arousal that accompanies unpredictability is dampened [27,28].

Literature on the use of music in an operating environment is limited in its applicability to ophthalmic procedures. Indeed, neither Bernatzky et al's review of the therapeutic potential of music in healthcare, or Hole et al's systematic review and meta-analysis addressing the value of music for post-operative recovery examined any studies that focused on ophthalmic surgeries [2,4]. This paper acknowledges that extensive literature has been done to show what value music has for the patient undergoing awake surgery, and so begins to examine what music specifically carries the most value. Future enquiry into this may include asking patients what music they would like to listen to during pre-operative counselling, as asking on the day of surgery may make some feel as though they are being put on the spot with unfamiliar people, i.e. the theatre team. This may be a confounding factor that disguises the true music choices patients wish to make, and perhaps is more significant for those with a high external locus of control. In the same vein, another approach might be to ask patients to write their choice down, instead of verbalising it. This action may reduce the possible perception of being judged for personal musical choices.

Another important question is whether or not music has an effect on surgical skill. In a Gedanken experiment aiming to measure the highest possible surgical outcomes by somehow incorporating music into the theatre environment, there are two conditions to examine. On one hand, if the patient's ability to remain calm and still are maximised, their outcomes are likely to be better than if they were anxious and agitated. On the other, if the surgeon's ability to achieve and maintain a calm and focused state are enhanced, patient outcomes will also be better. In a group of 14 ophthalmologists and 12 ophthalmology residents, listening to Mozart while using the EyeSi surgical simulator, the roundness of capsulorrhexis (a key step

in cataract surgery) improved by 33.1% (p=0.0367) and total scores by 23.3% (p=0.0249). Surgical skill was not found to be a significant confounding variable [29]. However, if a statistically significant difference exists between the surgical outcomes when the focus is on optimising patients' relaxation and stillness, or surgeons' calmness and focus, it is likely to be lost in a blurry confidence interval. Clearly, optimising both would be ideal. Headphones under the surgical drape could be considered where there are differences in musical taste between the patient and the operating surgeon [10], although this should be considered against the reduced ability of the patient to listen to instructions.

## Conclusions

Music offers a reliable, controllable object to patients undergoing awake day surgeries – here, cataract surgery. Most do want to listen to music, and will make a choice given the chance. As a method of distraction, it is simple, effective, and inexpensive. This paper describes that classical music is the main preference among patients undergoing routine awake cataract surgery.


## Acknowledgements

Thank you to the theatre staff at the clinic for being instrumental to data collection. A special thank you to both Michael Bates and David Hughes for helping tremendously with grouping the data. Both are professional composers/ musicians, romantic-modern and jazz respectively. Finally, thank you to Dr Adam Hickson, consultant psychiatrist, for contributions on the emotional implications of music.


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