

# Perception of Gastrointestinal Endoscopy by Patients and Examiners with and without Background Music

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## Key Words

Endoscopy · Gastrointestinal endoscopy · Music · Conscious sedation

## Abstract

**Background/Aims:** Several studies have reported improved patient comfort with music in the preoperative setting, however music has seldom been assessed during gastrointestinal endoscopy. We aimed to assess how background music may influence the perception of patients and examiners involved in endoscopic examinations. **Methods:** 301 patients (128 females, 173 males; mean age 59 years) were included in the study (EGD and colonoscopy) in a prospective fashion. 90 EGD and 61 colonoscopies were performed with music (50.17%) and 102 EGD and 48 colonoscopies without music (49.83%). Patients, nurses and endoscopists completed a questionnaire. **Results:** No significant differences in demographic data were found between the patients examined with or without music. Tolerance to the examination, pain sensation and perception of the endoscopy room ambiance were similar in both groups. The majority of patients (83.4%) expressed a preference for music during any future endoscopic examination and none perceived the music as disturbing. During the 151 examinations, music was considered unpleasant in 14 examinations by the

physicians (9.3%) and in 11 examinations by the nurses (7.3%). **Conclusions:** Music has little influence on patients' experience of gastrointestinal endoscopy. Nevertheless, the majority of patients felt music to be helpful and expressed a preference for music during any future examination. This positive attitude to music of patients is in contrast with the assessment of some endoscopists and nurses.

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## Introduction

Many patients express anxiety prior to gastrointestinal endoscopy. Several non-randomized, observational studies have found beneficial effects of music in the preoperative setting, during medical examinations or in the immediate postoperative recovery period. These findings have been supported by two randomized controlled studies that reported a reduction in the use of the sedative medication with the use of relaxation music during colonoscopy [1, 2]. Other well-designed studies did not find any influence of music on the dosage of the premedication or anesthetic agents in a variety of interventional procedures [3–7]. Music is not used routinely during endoscopic procedures. Some physicians start endoscopy without sedation [8, 9], particularly in non-anxious patients [10], how-

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0012-2823/03/0681-0005\$19.50/0

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ever most prefer to perform endoscopic examinations with conscious sedation or under general anesthesia [11]. In the USA only one fifth of patients undergoing colonoscopy are willing to undergo the examination unsedated [12]. The systematic use of other measures to improve patient tolerance to gastrointestinal procedures is unusual, possibly because the use of sedation has been shown to be safe [13]. Detailed information about the procedure, a calm and relaxed atmosphere or the presence of a relative during the endoscopy as well as the viewing of videotapes before the examination seem to play a secondary role [14, 15]. Few studies have studied the use of music during endoscopic procedures, and only the attitudes of patients and not of examiners have been assessed [1, 16–20]. Our study investigated how background music may influence the experience of patients undergoing endoscopy, and provides the first data concerning the acceptance of music by the medical staff.

## Patients and Methods

From March to April 1999, consecutive patients referred for upper (EGD) or lower gastrointestinal (colo) endoscopy were examined with music (m+). A control group was examined without music (m-). Our study was not randomized. In the daily routine it was not possible for us to perform a randomization. So we chose to examine the patients sequentially with music and without music. The patients were enrolled in the study after obtaining informed consent. Exclusion criteria included: inability to answer questions because of severe illness, impaired consciousness, impaired hearing and emergency interventions. In total, 20 patients were excluded from the study. Patients could choose between two styles of music (non-classical/light or classical). The music was played in the background and the volume was adjusted to permit normal conversation. EGD was performed after topical anesthesia with an anesthetic throat spray (lidocaine 10%), intravenous injection of midazolam, and occasionally pethidine. Total colonoscopy or sigmoidoscopy was usually performed without sedation except in those cases where the patient was very anxious before the examination or if patients felt the examination as painful. All patients were monitored by continuous pulse oximetry and heart rate measurement. During the endoscopy, conversation related to patient care was allowed.

After recovery from the sedation a validated 100-mm visual analogue scale [21] was used to assess the patient's experience of the endoscopic procedure (general appraisal of the examination, pain, tolerance and ambiance of the endoscopy room). The m+ patients were also asked to choose the most appropriate descriptor: unpleasant, indifferent, or helpful (relaxing, calming) that described their response to music during the procedure. Patients listening to music were also asked to state if they would choose to listen to music during a future endoscopic examination. The medical staff involved in the examination (8 nurses and 6 medical physicians) assessed their experience of the music in the same manner and the endoscopist also recorded if the music had been turned off during the examination.

The data were analyzed with Statview 4.5 (Abacus w). Demographic data were tested by unpaired t-test or  $\chi^2$  test. The perception of the examination in both groups was compared using a non-parametric unpaired (Mann-Whitney) test. p values <0.05 were considered significant.

## Results

301 outpatients and inpatients were analyzed (128 females and 173 males; mean age 59 years). 151 examinations (90 EGD and 61 colonoscopies) were performed with music and 150 (102 EGD and 48 colonoscopies) without music. There was no statistical difference in the age or sex distribution between the m+ and m- groups for patients undergoing EGD or colonoscopy (for age in EGD p = 0.13, in colo p = 0.31; for sex in EGD p = 0.65, in colo p = 0.25).

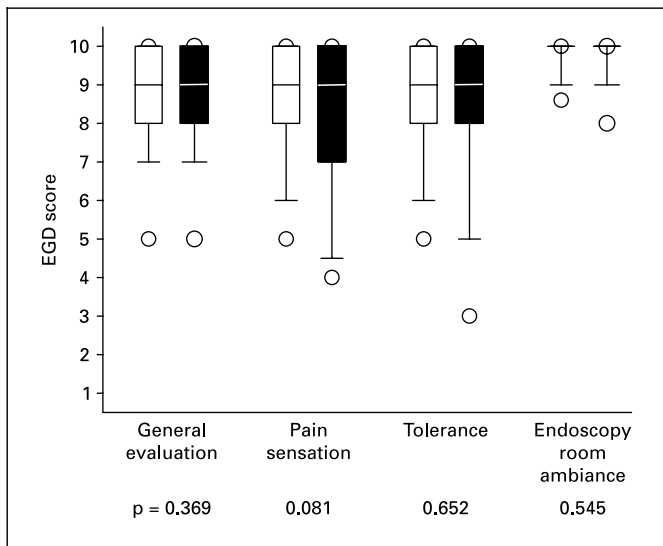
*Choice of music:* 23 (25.6%) patients in the EGD m+ group preferred light music and 67 (74.4%) classical. The majority of patients in the colo m+ group favored classical music: 46 (75.4%) versus 15 (24.6%).

*Sedation:* In the EGD group all 90 patients received sedation with midazolam (median dose 2.5 mg in both EGD m+ and EGD m-) on commencing the examination (p = 0.21). Sixteen patients also received pethidine (median dose 25 mg in EGD m+ and EGD m-, p = 0.46).

During colo m+, 22 patients received midazolam (median 2.5 mg) and 16 additional pethidine (median 25 mg). In the colo m- group, 18 patients received midazolam (median dose 2.5 mg) and 22 pethidine (median dose 37.5 mg). We found no difference between the colo m+ and m- (for midazolam p = 0.28 and for pethidine, p = 0.66) concerning the demand for sedation.

*Patient assessment of the examination:* For the EGD group we found no significant differences between m- and m+ for the general perception of the examination, assessment of pain, tolerance of the procedure, and the perception of the ambiance of the endoscopy room (fig. 1). In the colo group (fig. 2) the general evaluation of the examination was significantly better with music (score-median values 8 colo m- versus 9 colo m+, p = 0.037).

Assessing the 151 m+ examinations, 128 patients (84.7%) considered the music had been helpful (relaxing or calming), 16 were indifferent, and 7 did not answer the question. No patient considered the music had been unpleasant. In the event that a further endoscopic examination should be necessary, 126 (83.4%) patients indicated that they would like to listen to music again.



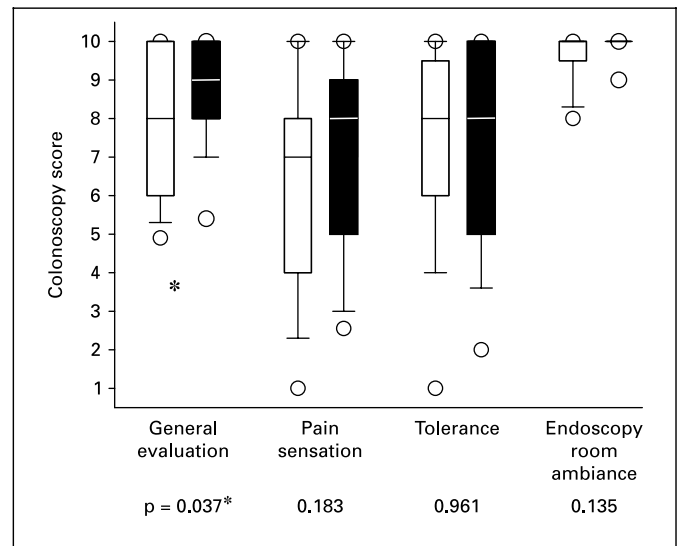
**Fig. 1.** Patients' appraisal of the esophagogastroduodenoscopy. Values: medians (lines); 25–75% percentiles (boxes); 10–90% percentiles (bars); 5–95% percentiles (dots) without (□) and with (■) music.

*Medical staff appraisal of music during the procedure:* Assessing the 151 m+ examinations, endoscopy nurses considered the music disturbing in 11 examinations (9 EGD and 2 colo, 7.3%), felt indifferent in 66 examinations (43.7%) and liked the music in 74 examinations (49%). The endoscopists were disturbed by the music in 14 examinations (6 EGD and 8 colo, 9.3%), felt indifferent in 69 examinations (45.7%) and liked the music in 68 examinations (45%). In 2 cases the music was turned off during the procedure (1 EGD and 1 colo).

The appraisal of music during endoscopy was significantly more positive among the patients than the endoscopy staff (examiners and nurses did not like to hear music in 14 and 11 cases respectively; no patient disliked the music,  $p < 0.01$ ). The reasons for disliking music were: difficult therapeutic procedures (music turned off during 2 examinations because of dilatation and polypectomy) or the music was felt to be repetitive, monotone, tedious, inappropriate or irritating.

## Discussion

Several reports indicate that music might improve patients' comfort in the preoperative setting, during medical examinations or in the immediate postoperative recovery period. A recent randomized study showed a



**Fig. 2.** Patients' appraisal of the colonoscopy (for values, see figure 1).

decrease in the sedation dosage during colonoscopy [1]. Nevertheless, music is seldom utilized during endoscopic procedures, and there is little data on patients' perception of music and no published data on the acceptance of music by the medical staff.

Our study is the first to assess the perception of gastrointestinal endoscopic examinations with music by the patients and the medical staff. We analyzed the perception and sensations by patients and the medical staff on the utilization of music in 151 consecutive endoscopies with a control group of 150 patients. Our evaluation found no significant differences in patients' perception of pain, tolerance of the endoscopic procedure or the ambiance in the endoscopy suite. Patients undergoing colonoscopy felt that music was beneficial in their general evaluation (median score 8 vs. 9,  $p = 0.037$ ). This small difference in a single parameter is difficult to interpret, and we considered the finding clinically irrelevant. Nevertheless, the majority (84.7%) of the patients felt music to be helpful, and 83.4% of all patients expressed a preference for music during any future endoscopic examination. No patient was disturbed by the music. In contrast to patients' positive assessment of music, the examiners and nurses were disturbed by its presence during 9.3% of upper and 7.3% of lower gastrointestinal endoscopies respectively ( $p < 0.01$ ), and in 2 cases the music was turned off.

We utilized background music without headphones so that the medical staff as well as the patient had to listen to the music. One explanation for the different assessments of music by patients and endoscopy staff might be that the music style was chosen solely by the patient. This effect could be avoided if the music is played through headphones. However, this has the clear disadvantage that the patient is 'isolated' and that verbal communication during the examination (e.g. explaining findings or therapeutic steps) might be more difficult.

Patients were consecutively examined with and without music, and there was no randomization. However, in the statistical analysis there was no difference in sex, age and sedation between the two groups. Therefore, we conclude that the two examined groups are comparable.

Our results confirm the findings of other studies [20] that found the ambiance in the endoscopy room to have little effect on patients' experience of the procedure. We did not assess anxiety scores prior to the procedure, however if sedation is used, anxiety may not greatly influence the tolerance of the procedure [19]. Trinchet et al. [16] also failed to identify any benefit of music in their study with 60 patients. Immediately following the examination

and 1 month afterwards, no difference between the two groups was present and the authors concluded that music could not replace conscious sedation.

Despite the failure of this and most previous studies to demonstrate objective benefits of music during endoscopy, a large proportion (84.7%) of patients found music helpful during the procedure and expressed a preference for music during any future examination (83.4%). We believe that this should encourage us to offer music to patients undergoing endoscopy. If the endoscopy staff is disturbed by background music, then headphones could be offered to the patient.

We conclude that background music did not produce a relevant effect on patients' perception of gastrointestinal endoscopic examinations even if they potentially want it. Nevertheless, the majority of patients felt music had been helpful and expressed a preference for music during any future procedure. The positive assessment of music by patients is in contrast to the more variable attitude to music articulated by the endoscopy staff. Nevertheless, we suggest that music be offered to patients undergoing endoscopy. Should this intervention disturb examiners we suggest that patients should be offered headphones.

## References

- Lee DWH, Chan KW, Poon CM, Ko CW, Chan KH, Sin KS, Sze TS, Chan ACW: Relaxation music decreases the dose of patient-controlled sedation during colonoscopy: A prospective randomized controlled trial. *Gastrointest Endosc* 2002;55:33-36.
- Schiemann U, Gross M, Reuter R, Kellner H: Improved procedure of colonoscopy under accompanying music therapy. *Eur J Med Res* 2002;7:131-134.
- Corah NL, Gale EN, Pace LF, Seyrek S: Relaxation and musical programming as means of reducing psychological stress during dental procedures. *J Am Dent Assoc* 1981;103:232-234.
- Rickert VI, Kozlowski KJ, Warren AM, Hendon A, Davis P: Adolescents and colposcopy: The use of different procedures to reduce anxiety. *Am J Obstet Gynecol* 1994;170:504-508.
- Dubois JM, Bartter T, Pratter MR: Music improves patient comfort level during outpatient bronchoscopy. *Chest* 1995;108:129-130.
- Heiser RM, Chiles K, Fudge M, Gray SE: The use of music during the immediate postoperative recovery period. *AORN J* 1997;65:777-8, 781-785.
- Cruise CJ, Chung F, Yogendran S, Little D: Music increases satisfaction in elderly outpatients undergoing cataract surgery. *Can J Anaesth* 1997;44:43-48.
- Nichols AM, Cunningham JT: Upper endoscopy without sedation (abstract). *Gastrointest Endosc* 1982;28:140.
- Al-Atrakchi HA: Upper gastrointestinal endoscopy without sedation: A prospective study of 2,000 examinations. *Gastrointest Endosc* 1989;35:79-81.
- Fisher NC, Bailey S, Gibson JA: A prospective, randomized controlled trial of sedation vs. no sedation in outpatient diagnostic upper gastrointestinal endoscopy. *Endoscopy* 1998;30:21-24.
- Balsells F, Wyllie R, Kay M, Steffen R: Use of conscious sedation for lower and upper gastrointestinal endoscopic examinations in children, adolescents, and young adults: A twelve-year review. *Gastrointest Endosc* 1997;45:375-380.
- Early DS, Sifuddin T, Johnson JC, King PD, Marshall JB: Patient attitudes toward undergoing colonoscopy without sedation. *Am J Gastroenterol* 1999;94:1862-1865.
- Froehlich F, Schwizer W, Thorens J, Kohler M, Gonvers JJ, Fried M: Conscious sedation for gastroscopy: Patient tolerance and cardiorespiratory parameters. *Gastroenterology* 1995;108:697-704.
- Gebbensleben B, Rohde H: Angst vor der gastrointestinalen Endoskopie - ein bedeutsames Problem? *Dtsch Med Wochenschr* 1990;115:1539-1544.
- Goenka P, Manalo G, Jobson BJ, Neumann JK, Thomas E: Informed consent for colonoscopy by videotape vs. printed material: A prospective randomized comparative study of patients' understanding and stress (abstract). *Gastrointest Endosc* 1999;49:AB196.
- Trinchet JC, Chaumont J, Beaugrand M, Ferrer JP: La musique adoucit-elle l'endoscopie? Une étude contrôlée chez 60 malades. *Gastroenterol Clin Biol* 1985;9:86-87.
- Escher J, Höhmann U, Anthenien L, Dayer E, Bosshard C, Gaillard RC: Musik bei der Gastroskopie. *Schweiz Med Wochenschr* 1993;123:1355-1358.
- Palakanis KC, DeNobile JW, Sweeney WB, Blankenship CL: Effect of music therapy on state anxiety in patients undergoing flexible sigmoidoscopy. *Dis Colon Rectum* 1994;37:478-481.
- Bampton P, Draper B: Effect of relaxation music on patient tolerance of gastrointestinal endoscopic procedures. *J Clin Gastroenterol* 1997;25:343-345.
- Stermer E, Levy N, Beny A, Meisels R, Tamir A: Ambience in the endoscopy room has little effect on patients. *J Clin Gastroenterol* 1998;26:256-258.
- Revill SI, Robinson JO, Rosen M, Hogg MU: The reliability of a linear analogue for evaluating pain. *Anesthesia* 1976;31:1191-1198.