

WHITE PAPER

AUDIOVISUAL DISTRACTION

Clinical evidence and benefits of the HappyMed
Video Glasses for health care teams and patients

A focused review of the evidence on non-pharmacological anxiety, stress and pain management in regional anaesthesia, sedation and monitored anaesthesia care.



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This white paper focuses on the use of the HappyMed Video Glasses and comparable virtual-reality (VR) and audiovisual-distraction (AVD) systems in anaesthesia. All statements are based solely on the cited studies. For readability, all personal designations apply equally to all genders.

EXECUTIVE SUMMARY

Up to **97% of surgical patients experience preoperative anxiety**.¹ Anxious patients require higher doses of sedatives and analgesics, face a greater risk of complications and delirium, recover more slowly and occupy beds longer: a cascade that drives up both staff workload and cost. Audiovisual distraction (AVD) addresses this problem at its source. By immersing patients in a calming audiovisual environment, it reduces anxiety, stress and the need for pharmacological sedation before, during and after medical procedures. The approach is supported by a broad body of evidence spanning decades and disciplines including a 2025 meta-analysis of more than 3,000 patients,² and was most recently confirmed by a randomised, sham-controlled trial of the HappyMed glasses in cardiac valve interventions, published in JACC: Advances in 2026.⁵² The data on audiovisual distraction consistently show the same pattern: **less anxiety, fewer sedatives and greater patient comfort**.

-56% lower post-procedural anxiety with HappyMed glasses during M-TEER* (sham-controlled RCT, n = 60)⁵²	-31% lower propofol dose during colonoscopy under patient-controlled sedation with audiovisual distraction versus sedation alone* (RCT, n = 165)³⁰	93% of patients would recommend and reuse the device for future procedures (prospective clinical protocol, n = 50)⁹
-22% lower propofol dose with HappyMed glasses during mitral valve repair (M-TEER) under sedation* (sham-controlled RCT, n = 60)⁵²	-61% lower subjective pain perception with AVD during shockwave lithotripsy* (prospective study, n = 118)³	90% of patients prefer AVD over general anaesthesia (patient survey, n = 50)⁴

*Percentages derived from published group means: propofol 4.6 vs. 5.9 mg/kg/h and anxiety [NRS] 1.1 vs. 2.5 (Rawish 2026);⁵² propofol 0.81 vs. 1.18 mg/kg (Lee 2004);³⁰ pain 2.4 vs. 6.1 (Marsdin 2012).³

WHAT THIS MEANS FOR THE CLINIC

A single, reusable device intervenes **before** the anxiety–medication–complication–cost cascade begins. It improves patient care and hospital economics alike, with minimal additional resources.

1. REDUCED STRESS & ANXIETY

Surgery-related anxiety is a natural response to an unpredictable, threatening situation. In a survey of 120 patients aged 18+, 97% reported preoperative anxiety, driven mainly by the prospect of general anaesthesia, waiting in the day-surgery unit and anticipated postoperative pain.¹ Being awake during surgery and the sight of the operating theatre were singled out as particularly anxiety-provoking.¹⁰ Left unaddressed, this anxiety increases medication needs, delays recovery and prolongs hospital stays. Audiovisual distraction intervenes before that loop takes hold.

1.1. How audiovisual distraction works

The brain has a limited capacity to process painful, distressing or anxiety-inducing stimuli. When attention is shifted to more pleasant sensations, activity falls in the brain regions associated with pain.¹⁹ Engaging patients with films and sound limits their capacity to focus on anxiety and has been shown to **reduce subjective pain perception by up to 61%**.³ This mechanism translates into measurable clinical effects. In a randomised pilot trial in orthognathic surgery, severe emergence agitation occurred in 21% of patients receiving preoperative audiovisual distraction, compared with 40% under standard care. The use of video glasses was rated safe, feasible and well accepted.¹⁴ In practical terms, this suggests that a few minutes of audiovisual distraction before induction nearly halved the rate of severe agitation on waking. The same mechanism underlies the effects described in the following sections: what the brain does not attend to, it does not amplify.

WHAT THIS MEANS FOR THE PATIENT

- 82% of patients reported that audiovisual distraction reduced their anxiety during elective limb surgery under regional anaesthesia.⁴
- A 2025 meta-analysis (37 studies, 3,152 patients) found VR significantly reduces in-hospital anxiety on the Numeric Rating Scale and pain, with shorter recovery times and no serious adverse events; confirming VR as a safe adjunct to standard anaesthetic care.²
- In randomised trials in interventional cardiology, distraction with video glasses significantly reduced anxiety during transfemoral TAVI, where the perceived duration of the procedure was also shorter,³⁴ and during cardiac-device implantation, with no measurable effect on pain.³⁶
- In children undergoing elective surgery, a systematic review found that audiovisual interventions reduce anxiety in the pre-, intra- and postoperative phases.²⁰

Across settings and age groups the benefit for patients is concrete: **less anxiety, less pain, and a procedure that feels shorter**; at no additional risk.

1.2. The clinical consequences of untreated anxiety

If it is not addressed, anxiety sets off a chain of clinical consequences. A high level of preoperative anxiety is accompanied by heightened pain perception and greater postoperative analgesic consumption. The link to postoperative pain intensity is direct and independent of a patient's general anxiety trait.¹¹ Anxious patients also require higher doses of propofol to reach adequate sedation.¹² Each link amplifies the next:

Driver	Clinical consequence
 Complications (systematic review & meta-analysis, 20 RCTs)	Heightened anxiety complicates presurgical drug administration, hinders anaesthesia induction and is associated with poorer post-surgical outcomes. ¹³
Emergence delirium (prospective cohort, n = 155)	Anxious children have a higher incidence of emergence delirium (9.7% vs. 1.5%) and require significantly more postoperative analgesia. ¹⁵
Prolonged stay (retrospective cohort, n = 307)	Autonomic activation raises respiratory rate, stress hormones and pain, activating pro-inflammatory pathways and slowing healing; patients with an anxiety diagnosis on anxiolytics stayed 1.8 days longer. ¹⁶
Avoidance of regional anaesthesia (patient survey, retrospective cohort, n = 382,236)	Anxious patients tend to choose general over regional anaesthesia, ¹⁷ where serious complications occur significantly more often. ¹⁸

Each of these consequences lengthens the hospital stay and raises cost. Anxiety raises subjective pain, which raises analgesic and sedative doses, which raises the rate of complications and emergence delirium, which extends recovery and bed occupancy. Addressing anxiety early breaks the chain at its first link, which is precisely where audiovisual distraction intervenes, and why it also reduces the need for sedatives and analgesics, as the following section shows.

2. REDUCED SEDATIVES & ANALGESICS

Sedation is intended to relieve stress, yet sedative and analgesic medication carries its own risks. Audiovisual distraction is an effective, non-pharmacological, low-cost way to reduce premedication and the over-consumption of analgesics while actively improving patient comfort.

2.1. The hidden risks of routine premedication

Sedative premedication suppresses parts of the nervous system, depresses respiration, and lowers blood pressure and heart rate. While reduced awareness may feel reassuring to patients, it exposes them to postoperative side effects. For example, patients premedicated with midazolam prior to 1–2 hours of propofol/remifentanyl anesthesia showed measurable memory impairment the day after surgery.²¹

Anxiolytic premedication has also been linked to poorer short-term outcomes, including longer hospital stays, higher re-operation rates, cardiovascular complications, and increased mortality.²² Patients with obstructive sleep apnea are particularly vulnerable: they show markedly higher rates of postoperative pulmonary complications and resource utilization, making sedative premedication a specific risk for this group.²³ Furthermore, a randomized trial comparing light versus deep sedation demonstrated that greater sedation depth does not reduce patients' subjective distress,²⁴ meaning deeper sedation adds risk without adding comfort.

Reducing preoperative sedation can protect elderly patients in particular from new-onset postoperative cognitive dysfunction (POCD) and emergence delirium. As summarised in *Deutsches Ärzteblatt International*, POCD has been reported at discharge in 41% of patients aged 60+ and in 36% of patients aged 18 to 39; the same review advises using sedative premedication with extreme caution and critically reconsidering the habitual practice of premedicating with medications such as midazolam.²⁵ This is why routine sedation should be reconsidered, with each decision guided by the individual patient rather than by habit. Audiovisual distraction offers precisely such an alternative: a non-pharmacological way to keep patients calm without the risks that come with premedication.

2.2. A non-pharmacological alternative

The anxiolytic effect of audio and audiovisual stimulation has been studied for decades. In the foundational randomised trial, adults undergoing urologic procedures under spinal anaesthesia with patient-controlled propofol sedation required significantly less propofol when listening to music.²⁶ This sedative-sparing effect has since been reproduced repeatedly:

Study & setting	Key result
AVD during colonoscopy (RCT, n = 165)	Patients receiving audiovisual distraction through video glasses required significantly less propofol . ³⁰
Music vs. midazolam, preoperative (RCT, n = 372)	Relaxing music reduced anxiety more than oral midazolam; higher effectiveness and no apparent side effects make it a useful alternative to sedative premedication. ²⁷
VR vs. midazolam during spinal anaesthesia (RCT, n = 37)	VR distraction without sedative produced higher patient and anaesthesiologist satisfaction and significantly fewer apnoea events than repeat-dose midazolam. ³¹
Music interventions, preoperative (Cochrane review, 26 trials, n = 2,051)	Because preoperative sedatives often cause side effects and delay recovery and discharge, music interventions are a valuable alternative and should be offered more frequently. ²⁸
Music during spinal anaesthesia (RCT, n = 92)	Propofol requirement for sedation significantly reduced (147.8 vs. 193 mg; p = 0.0001), with significantly lower intraoperative serum cortisol and lower postoperative anxiety scores . ²⁹
Port implantation under local anaesthesia (pilot RCT, n = 116)	Fewer patients required any sedative drug (31.7% vs. 42.8%; p = 0.17) and doses of individual sedatives were lower, but no difference reached statistical significance; pain and anxiety scores were comparable. ³⁵

2.3. Pain and analgesic requirements

The same effect extends to pain. By occupying attention, audiovisual distraction measurably lowers pain perception and, with it, the need for analgesia. During shockwave lithotripsy for kidney and ureteric stones (n=118), video-and-music distraction cut the patient-reported pain score from a mean of 6.1 to 2.4 (p < 0.0001) and the distress score from 4.4 to 1.0 (p = 0.0001), reductions of 61% and 77%.³ A separate clinical protocol using a VR device (HypnoVR) during the same procedure reported excellent pain and anxiety tolerance, with 93% of patients willing to recommend and reuse the device.⁹ These clinical findings rest on a consistent mechanistic basis: AVD raises the objective pain threshold and reduces distressing recall of the procedure,³⁸ modulates autonomic responses including respiration and heart-rate variability,³⁹ and is well tolerated in combination with mind–body techniques.³⁷

The magnitude of this effect depends on the setting. It is most pronounced where baseline anxiety and sedative requirements are high, which is why the clearest results come from interventional procedures in elderly, comorbid patients. One benefit, however, recurs independently of the setting and of pain and anxiety scores alike: **patients perceive the procedure as significantly shorter**. This was reported in a 2025 randomised trial in patients undergoing prostate biopsy⁴¹ and, independently, in a randomised study of 117 patients undergoing transfemoral TAVI.³⁴ This shows that by lowering pain and the anxiety that amplifies it, audiovisual distraction reduces the analgesic and sedative load a procedure demands, and leaves patients experiencing it as shorter and more tolerable.

2.4. Evidence with the HappyMed Video Glasses

What the evidence shows in general, the HappyMed Video Glasses deliver in practice. These findings come from cardiology and anaesthesia departments at university hospitals and specialist heart centres, including the Universitätsklinikum Schleswig-Holstein, Universitäres Herzzentrum Lübeck, Universitätsklinikum Essen, the Deutsches Herzzentrum Berlin and the Schön Klinik Hamburg Eilbek.

- **M-TEER (mitral transcatheter edge-to-edge repair), RCT (2026).** In a randomised, sham-controlled trial of AVD in M-TEER (n=60), the HappyMed glasses significantly reduced propofol requirements, lowered post-procedural anxiety and improved overall satisfaction, with comparable procedural time, haemodynamics and in-hospital safety.⁵²
- **TAVI under monitored anaesthesia care (2023).** In a randomised trial of audiovisual distraction during transcatheter aortic-valve replacement (n = 90), the HappyMed glasses were safe for peri-interventional use and significantly reduced the required dose of remifentanyl.³³
- **Transfemoral TAVI (2023).** In a randomised study (n=117) the video glasses significantly reduced anxiety scores and the perceived duration of the procedure; they were feasible and safe throughout and extended the range of non-pharmacological options with minimal additional resources.³⁴
- **Coronary angiography (2021).** In a small comparative case series (6 patients with glasses vs. 6 matched procedures without), anxiety and stress fell by 49% from baseline in the glasses group, while the control group remained at baseline. Midazolam and fentanyl doses were reduced by 50% and 57% respectively.⁵

WHAT THIS MEANS FOR ANAESTHESIA DEPARTMENTS

- Every milligram of propofol, midazolam or remifentanyl that is not given is a dose that cannot depress respiration, destabilise haemodynamics or contribute to postoperative cognitive dysfunction, and therefore cannot generate the monitoring time, recovery-room capacity and complication management that follow from it.
- Audiovisual distraction acts on the first link of this chain. It requires no drug, no additional staff and no change to the procedure itself, and it does so with a **single reusable device**, in precisely the patients who are least able to tolerate sedation: elderly, comorbid patients undergoing structural heart interventions.⁵²

The same logic applies to acceptance:

- A procedure that feels shorter is a procedure patients are willing to undergo awake: among patients with prior experience of general anaesthesia, **90% rated regional anaesthesia with audiovisual distraction as the better experience**, and 45% required no sedation at all.⁴

3. PROCESS OPTIMISATION & RECOVERY

In the era of fast-track surgery, rapid patient recovery has become a central focus of OR (operation room) management. Effective pain control, careful anaesthetic choice, cautious use of premedication and early mobilisation all shorten the hospital stay. By reducing anxiety without drugs, audiovisual distraction supports each of these goals, saving time and money while improving outcomes.

3.1. Attenuating the perioperative stress response

Fast-track programmes aim to minimize surgical stress, enabling earlier discharge and a faster return to daily life with fewer complications.⁴² Achieving this requires rethinking traditional clinical pathways. The benefits are measurable: efficient processes, reduced time and costs, and higher patient satisfaction, all without compromising the quality of care. Industry estimates suggest that implementing fast-track concepts can generate savings of 11 to 26% by shortening recovery times and hospital stays.⁸ Furthermore, because patient anxiety can prolong recovery, increase complication risks, and drive the need for general anaesthesia, effectively managing this anxiety is a core component of the methodology.

3.2. Widening the range of awake procedures

To save time and expand the possibilities for awake procedures, efficient OR scheduling is essential. Waiting in the day-surgery unit is itself a leading cause of anxiety.¹ Video glasses fill these waiting times, giving the patient something to focus on during a sensitive window and reducing loneliness and fear of the unknown, while the team prepares. Crucially, by replacing sedative premedication, this approach prevents a prolonged time-to-wakefulness in recovery, keeping procedures on schedule and facilitating a wider range of surgical procedures under regional anaesthesia.⁶ Recent clinical evidence highlights exactly how implementing this type of non-pharmacological distraction expands the viability of awake procedures across diverse patient groups.

- **Smoother regional-anaesthesia workflow.** In a before–after study of 100 ambulatory upper-limb procedures under peripheral nerve block, adding immersive distraction was associated with higher patient satisfaction, a benefit still present two months after surgery, lower intraoperative anxiety and fewer intraoperative haemodynamic events.⁴³
- **Feasible even in long and complex cases.** Audiovisual distraction has been used successfully as an adjunct to epidural anaesthesia in procedures lasting more than nine

hours, with patients reporting high satisfaction and willingness to recommend awake regional anaesthesia.⁴⁴

- **Extends eligibility for awake techniques.** In a case series of five operations in patients with paraplegia, audiovisual distraction as an adjunct to stand-by anaesthesia made awake major surgery acceptable in a high-risk group, with the potential to reduce overall anaesthetic risk.⁴⁵
- **Earlier discharge from recovery.** In a randomised trial in 108 children, tablet-based distraction instead of oral midazolam shortened the median time to PACU discharge from 111 to 87 minutes ($p = 0.03$), with a lower observed incidence of emergence delirium.⁶

3.3. Enhanced recovery: less stress, faster healing

Fear and distress before surgery are linked to slower, more complicated recovery. This finding was established decades ago in psychoneuroimmunology, where stress and pain were shown to delay wound healing.⁴⁶ The physiological stress response raises cortisol, which down-regulates the early inflammatory response and impairs wound repair;⁴⁷ anxiety is additionally a risk factor for infection and poorer surgical outcomes.¹³ Reducing anxiety therefore improves not only the patient's experience but potentially the course of recovery itself. Avoiding over-sedation matters in recovery too. Sedatives disrupt the circadian melatonin rhythm and impair the deep sleep during which the brain recovers. Longer sedation is also associated with higher mortality and longer stays.⁴⁸ Where distraction reduces the need for sedation, it also helps avoid these downstream effects.

3.4. Regional versus general anaesthesia

The choice of anaesthetic technique strongly influences recovery time and length of stay. In a retrospective cohort of 10,868 patients undergoing hip or knee arthroplasty, 30-day mortality in the propensity-matched analysis (2,135 pairs) was **58% lower** under spinal compared with general anaesthesia and hospital stay was shorter.⁷

Regional nerve blockade further offers reduced opioid requirements, earlier ambulation and discharge, enhanced rehabilitation and less persistent postsurgical pain.⁴² Yet given the choice, patients frequently chose general anaesthesia, mainly because of the anxiety of being awake during the procedure.¹⁷ This is precisely the barrier audiovisual distraction removes:

Evidence	Effect on acceptance & experience
Day-case orthopaedic surgery under local/regional anaesthesia (multicentre RCT, n = 50)	In a randomised trial comparing fixed-content video glasses (HappyMed system) with self-selected music, anxiety decreased significantly in both groups. Although patients listening to music experienced a larger reduction in anxiety, those using the video glasses rated their overall experience significantly higher. ⁴⁹
Awake surgery (patient survey, n = 50)	90% of patients with prior general-anaesthesia experience judged regional anaesthesia with audiovisual distraction better than their previous general anaesthesia. ⁴
Ambulatory knee surgery (poster presentation, n = 26)	While awake regional anaesthesia using video glasses proved feasible and resulted in comparable postoperative pain and opioid use, a notably positive outcome was the excellent experience reported by the medical staff. ⁵⁰
ED meta-analysis (systematic review and meta-analysis, 9 RCTs, n = 934)	In children undergoing procedures in the emergency department, virtual reality distraction significantly reduced procedural pain, anxiety and fear. ⁵¹

By making regional techniques more acceptable, video glasses help shift the balance from general towards regional anaesthesia. This approach ensures lower risks, faster recovery, and reduced costs. It also avoids the complications and follow-up expenses associated with general anaesthesia,⁴² while establishing optimal conditions for fast-track surgery.

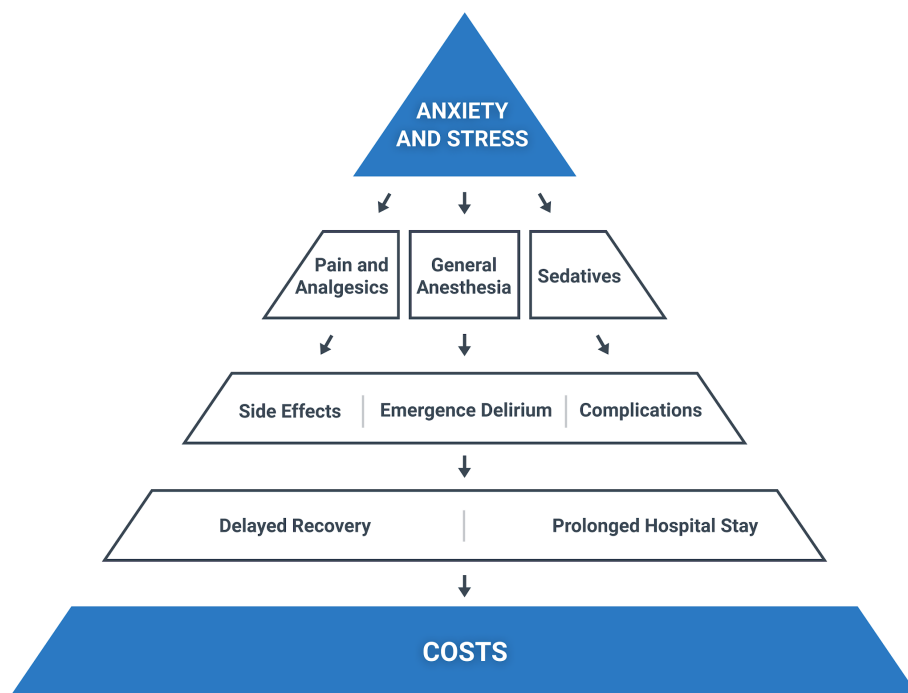
WHAT THIS MEANS FOR THE ANAESTHETIC WORKFLOW

- Every regional anaesthesia procedure avoids the need for induction, extubation, and a prolonged wake-up phase. While regional and local techniques shorten recovery times, reduce opioid requirements, and allow for earlier discharge, their success depends entirely on the patient being willing to stay awake. Ultimately, **patient anxiety is the primary barrier to this approach.**
- **Audiovisual distraction removes that barrier.** It bridges waiting times before the procedure, supports the patient during it, and avoids the prolonged time-to-wakefulness that follows sedative premedication.

CONCLUSION

Supported by decades of research and a comprehensive 2025 meta-analysis, the evidence is clear. Non-pharmacological anxiety management safely reduces drug consumption, accelerates recovery, and promotes the use of highly efficient regional anaesthesia techniques.² A rigorous 2026 randomised controlled trial further validated these benefits, demonstrating that HappyMed video glasses significantly reduced propofol requirements and anxiety in frail elderly patients while maintaining absolute haemodynamic stability.⁵²

Ultimately, by providing a safe, reusable, and highly effective distraction, HappyMed emerges as an evidence-based tool to simultaneously elevate patient care and optimize hospital economics.



*"Audiovisual distraction is an inexpensive, easy-to-administer and comprehensive method to reduce anxiety and its consequences."*³²

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