

Reducing Patient Anxiety in Procedural Dermatology

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Keywords:

Procedural dermatology; Anxiety; Laser;
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Abbreviations:

MMS: Mohs Micrographic Surgery; VAS: Visual Analog Scale; STAI: State-Trait Anxiety Inventory; BAI: Beck Anxiety Inventory

1. Review

Patient anxiety surrounding dermatologic procedures can lead to negative outcomes, such as impaired cognitive function and prolonged postoperative pain [1-3]. Herein we systematically review the literature on pharmacologic and non-pharmacologic anxiety reducing interventions across the breadth of dermatologic procedures.

The study protocol was registered online with PROSPERO. A primary literature search was conducted using PubMed, CINAHL, and Cochrane on July 20th, 2022 for peer-reviewed publications. Three authors, M.D., A.O., and A.E., independently searched and cross-checked the following search terms: “Mohs” OR “Micrographic surgery” OR “Mohs micrographic surgery” OR “MMS” OR “laser” OR “light based device” OR “dermatologic procedure” OR “skin biopsy” AND “anxiety”. Article types were limited to randomized controlled trials, prospective cohort, and single center cross sectional studies. A systematic search yielded 312 references, of which 30 underwent full-text review and 23 were ultimately included (Figure 1). The authors broadly categorized interventions for reducing patient anxiety as 1) Pharmacologic, 2) Recreational, 3) Informational/Communicative, and 4) Other. Data were collected on procedure type, intervention timing (pre-operative, intra-operative, or post-operative) and change in anxiety metric (Tables 1 and 2).

The majority of research in anxiety surrounding dermatologic procedures has been with MMS (15), followed by lasers (3), and dermatologic procedures in general (6).

In patients undergoing MMS, oral midazolam (5cc of 2mg/mL) was the most cited oral pharmacologic intervention with studies measuring anxiety at baseline, 60, and 120 minutes using visual analog scale (VAS) scores. In one study, patients receiving midazolam reported 92.3% decrease from baseline VAS anxiety scores at 60 minutes compared with placebo ($\Delta = -0.6$ vs $\Delta = -1.2$ respectively, $p = .01$) [3]. Patients reported a 70.5% ($\Delta = -2.4$) in mean anxiety at 60 minutes and 76.5% ($\Delta = -2.6$) decrease in mean anxiety at 120 minutes compared with baseline ($p < .001$) [3]. Recreational interventions such as self-selected music prior to the first stage of MMS compared to no music showed significant differences in State-Trait Anxiety Inventory (STAI) scores and VAS scores ($p < .001$) [3]. A randomized control trial with preoperative web app video-based patient education on MMS showed a 19% average decrease in anxiety ($p = .00062$) [3].

A laser tattoo removal study found that preoperative 30-minute muscle relaxation training achieved via therapist-guided meditation correlated with lower anxiety scores based on the Beck Anxiety Inventory (BAI), a self-reporting 21 item metric for anxiety ($p < 0.001$).

Metz et al. provided anxiety-reducing interventions in the pediatric population with recreational methods (portable DVD player, tablet computer, movies, puzzles, games, and TV shows), increasing subjective comfort and patient cooperation. From the pharmacologic standpoint, injection experience was better tolerated with administration of sucrose solution two minutes prior to procedure on anterior tip of the tongue or dipping a pacifier into the solution [5].

In conclusion, patient anxiety can be reduced using various pharmacologic and nonpharmacologic techniques. Our review revealed

the paucity of data on anxiety reducing intervention in non-MMS cutaneous procedures, highlighting the need for further research in these areas.

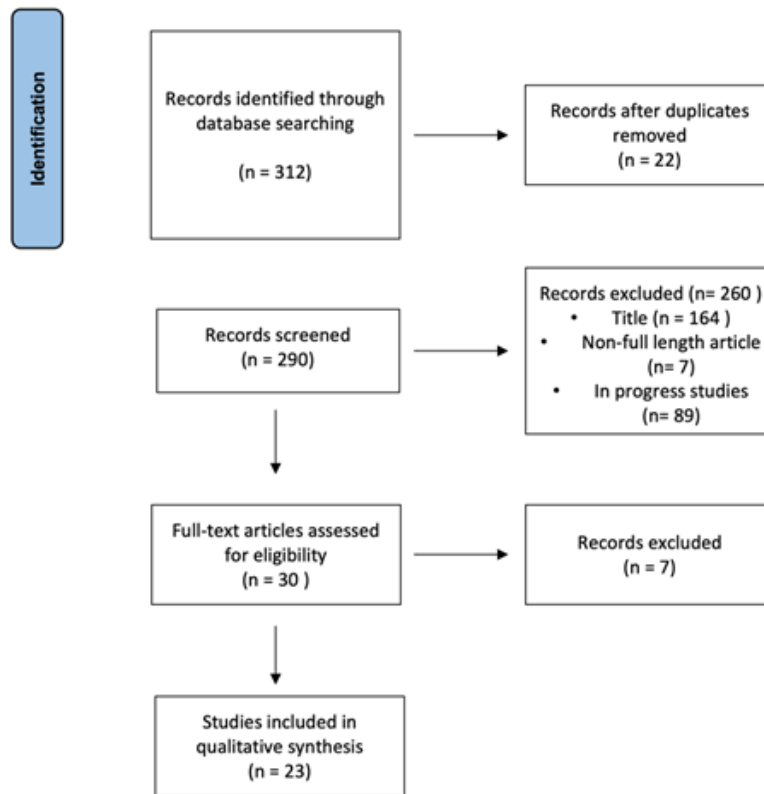


Figure 1:

Table 1: Summary of Pharmacologic and Recreational Interventions for Reducing Procedural Anxiety.

Procedure (Timing of Intervention)	Intervention	Metric of Anxiety Reduction	Statistically significant decrease in anxiety levels?
Pharmacologic			
MMS (preoperative)	1) RCT: Midazolam 5cc of 2mg/mL syrup vs color- and texture-matched placebo. 2) Prospective arm: Midazolam 2mg/mL syrup dosed based on weight, no placebo.	VAS	Yes
Dermatologic surgical procedures (ex: excision, laser, etc) (preoperative)	Oral transmucosal fentanyl citrate (OTFC) 400 mg vs 800 mg prior to procedure, no placebo.	Patient activity and anxiety score (AA Score)	Yes
MMS (preoperative)	Acetaminophen 1000 mg and 50 g of Gatorade powder in 350 mL of clear liquid) vs control.	VAS	Yes
Dermatologic surgical procedures, not specified (preoperative)	Oral midazolam was used as a single anxiolytic agent, in combination with local injected anesthetic.	Subjective scale (poor, fair, good, excellent), with excellent representing absent or minimal anxiety or discomfort.	Yes
Laser skin treatment, not specified, in children (preoperative)	1) 0.1 ml/kg orange flavored juice 2) 0.5 mg/kg of midazolam mixed with an equal volume of orange juice 3) 1.0 mg/kg of midazolam mixed with an equal volume of orange juice	A blinded observer scored each patient’s anxiety levels from 1 to 4, with 1 representing severe anxiety.	Yes

Recreational			
MMS (preoperative/intraoperative)	Listening to self-selected music while waiting for the physician and during the first stage of MMS (15–60 minutes) vs control.	VAS, STAI	Yes
MMS (preoperative/intraoperative)	Guided imagery recording vs standardized relaxation music recording vs control.	VAS, STAI	No
MMS (intraoperative)	Adult coloring book with water-based markers during the wait period after the initial MMS stage vs control.	VAS	Yes
MMS (intraoperative)	Two different types of virtual reality (VR) headset during the wait period after the initial MMS stage vs control.	Modified BAI	Yes
Dermatologic surgical procedures (shave/punch biopsy, excision, EDC, mutiple) (preoperative)	Chopin’s piano nocturnes through a headset during local anesthesia injection vs control.	VAS, STAI	Yes

MMS= Mohs Micrographic Surgery; VAS=Visual Analog Scale; STAI=State-Trait Anxiety Inventory; BAI=Beck Anxiety Inventory

Table 2: Informational, Communicative and Other Interventions for Reducing Procedural Anxiety.

Procedure (Timing of Intervention)	Intervention	Metric of Anxiety Reduction	Statistically significant decrease in anxiety levels?
Informational/Communicative			
MMS (preoperative)	Educational telephone call one week before surgery vs control.	VAS, STAI	No
MMS (preoperative, postoperative)	Educational video + wound care text messages vs video only vs text messages only.	VAS, STAI	Yes
MMS (preoperative)	3D printed 6-piece MMS model with 5-minute standard education (SE) by research team member vs 5-minute SE by research team member only.	VAS, STAI	Yes
MMS (preoperative)	Short, condensed video (1:40) highlighting the benefits, risks, and alternates of MMS vs control.	STAI	No
MMS	N/A	N/A	20% reported a subjective decrease in anxiety prior to the day of surgery by receiving a call from a doctor/nurse.
MMS (preoperative)	Standard patient education + additional video developed by the authors vs standard patient education only.	STAI	Yes
MMS (preoperative)	Instructional video created by the American College of Mohs Surgeons vs control.	VAS	No
MMS (preoperative)	Video-assisted informed consent in addition to verbal informed consent vs verbal informed consent only.	STAI	No

Dermatologic surgical procedures, not specified (preoperative)	Two minute animated educational video covering anesthesia, excision, repair, post-operative wound care, and pain management vs conventional consultation group (no video)	Modified APAIS	Yes*
Other			
Laser Tattoo Removal (preoperative)	30-minute muscle relaxation training by a therapist.	BAI	Yes
MMS (intraoperative)	Hand holding vs ball squeezing vs control.	N/A	No
Removal of benign (atypic nevus, cysts) or malignant skin lesions (NMSC) (preoperative)	Live trance induction lead by author followed by self-guided imagery vs recorded trance induction in author's voice followed by self-guided imagery vs control.	SUD scale	Yes**
Dermatologic surgical procedures, not specified (preoperative, intraoperative)	Diaphragmatic breathing instructed by experienced nurse vs control.	STAI, APAIS	Yes

MMS = Mohs Micrographic Surgery; VAS = Visual Analog Scale; STAI=State-Trait Anxiety Inventory; BAI=Beck Anxiety Inventory; APAIS= Amsterdam Preoperative Anxiety and Information Scale; SUD = Subjective Units of Discomfort

*Video with consultation group anxiety scores were lower than conventional consultation group across all categories but the difference was not statistically significant. After crossover, conventional consultation group patients reported statistically significant decrease in anxiety related to all areas except wound care after watching the video.

** At 20 minutes, there was a statistically significant difference in anxiety levels between the live and control groups (live anxiety levels average: 1.00 vs control anxiety levels: 2.64, p = .033)

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