Enhancing Patient Satisfaction and Quality of Life With Mohs Micrographic Surgery: A Systematic Review of Patient Education, Communication, and Anxiety Management

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PRACTICE **POINTS**

- When patients are treated with Mohs micrographic surgery (MMS), thorough in-person dialogue augmented by pre- and same-day telephone follow-ups can help them feel heard and better supported, even though follow-up calls alone may not drive satisfaction scores.
- Increased awareness and implementation of the various factors influencing patient satisfaction and quality of life in MMS can enhance clinical practice and improve patient experiences, with potential impacts on compliance, psychosocial well-being, medical outcomes, and physician reimbursement.
- Patient satisfaction and procedural understanding can be improved with video and visual-based education. Anxiety-reducing methods help lower perioperative stress.

Mohs micrographic surgery (MMS) is the gold standard for excising cutaneous tumors. Patients undergoing MMS may experience anxiety about local anesthesia or due to the functionally or cosmetically sensitive locations being treated. With the growing emphasis on value-based health care, patient satisfaction may begin to play an increasingly important role in physician reimbursements. We conducted a systematic review to evaluate the impact of patient education, communication, and anxiety-reduction methods on patient satisfaction and quality of life (QOL) associated with MMS. Increased patient satisfaction and QOL in MMS have been demonstrated through use of various perioperative measures to educate, communicate, and reduce anxiety. Awareness and implementation of these strategies may foster better patient-provider relationships and improved patient satisfaction.

Mohs micrographic surgery (MMS)—developed by Dr. Frederic Mohs in the 1930s—is the gold standard for treating various cutaneous malignancies. It provides maximal conservation of uninvolved tissues while producing higher cure rates compared to wide local excision.[1,2]

We sought to assess the various characteristics that impact patient satisfaction to help Mohs surgeons incorporate relatively simple yet clinically significant practices into their patient encounters. We conducted a systematic literature search of peer-reviewed PubMed articles indexed for MEDLINE from database inception through November 2023 using the terms *Mohs micrographic surgery* and *patient satisfaction*. Among the inclusion criteria were studies involving participants having undergone MMS, with objective assessments on patient-reported satisfaction or preferences related to patient education, communication, anxiety-alleviating measures, or QOL in MMS. Studies were excluded if they failed to meet these criteria, were outdated and no longer clinically relevant, or measured

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unalterable factors with no significant impact on how Mohs surgeons could change clinical practice. Of the 157 nonreplicated studies identified, 34 met inclusion criteria.

Perioperative Patient Communication and Education Techniques

Perioperative Patient Communication—Many studies have evaluated the impact of perioperative patient-provider communication and education on patient satisfaction in those undergoing MMS. Studies focusing on preoperative and postoperative telephone calls, patient consultation formats, and patient-perceived impact of such communication modalities have been well documented (Table 1).[3-8] The importance of the patient follow-up after MMS was further supported by a retrospective study concluding that 88.7% (86/97) of patients regarded follow-up visits as important, and 80% (77/97) desired additional follow-up 3 months after MMS.[9] Additional studies have highlighted the importance of thorough and open perioperative patient-provider communication during MMS (Table 2).[10-12]

Patient-Education Techniques—Many studies have assessed the use of visual models to aid in patient education on MMS, specifically the preprocedural consent process (Table 3).[13-16] Additionally, 2 randomized controlled trials assessing the use of at-home and same-day in-office preoperative educational videos concluded that these interventions increased patient knowledge and confidence regarding procedural risks and benefits, with no statistically significant differences in patient anxiety or satisfaction.[17,18]

Despite the availability of these educational videos, many patients often turn to online resources for self-education, which is problematic if reader literacy is incongruent with online readability. One study assessing readability of online MMS resources concluded that the most accessed articles exceeded the recommended reading level for adequate patient comprehension.[19] A survey studying a wide range of variables related to patient satisfaction (eg, demographics, socioeconomics, health status) in 339 MMS patients found that those who considered themselves more involved in the decision-making process were more

TABLE 1. Studies Evaluating Patient Consultation and Telephone Follow-Up Techniques

Evaluation method	Findings
Preoperative telephone calls	1-wk preoperative educational telephone call did not result in a statistically significant difference in patient anxiety or satisfaction levels[3]
Patient consultation	Most patients preferred same-day consultation prior to MMS[4]; most (84.7% [83/98]) patients were highly satisfied with their preoperative MMS education in a shared medical appointment format, which provided an interactive, low-stress environment in which to learn[5]
Postoperative telephone calls	Same-day postoperative telephone follow-up trended toward higher overall satisfaction and postoperative scar satisfaction in patients at both the suture removal visit and 3-mo follow-up[6]; while an RCT demonstrated that the timing of the telephone call (same day, 1 d or 2 d postoperative) did not make a difference regarding patient satisfaction, a prospective survey study found patients to prefer telephone follow-up the evening following the procedure[7,8]

Abbreviations: MMS, Mohs micrographic surgery; RCT, randomized controlled trial.

TABLE 2. Studies Assessing the Importance of Patient-Provider Communication During the MMS Experience

Reference (year)	Findings
Xu et al[10] (2017)	Through assessment of MMS patient online reviews (N=216), 74% and 78% of patients reported communication and bedside manner, respectively, as one of their top 3 positive characteristics regarding their MMS encounter
Golda et al[11] (2018)	Communication was the most influential factor impacting the patient experience, followed by perceived time spent and access to care
Patel et al[12] (2021)	Review of various educational techniques in MMS—including telephone calls, educational videos, pamphlets, online materials, 3-dimensional models, and shared medical appointments—concluded that while multiple modalities may help patients conceptualize MMS, none supersede in-person provider communication

Abbreviation: MMS, Mohs micrographic surgery.

satisfied in the short-term, and married patients had even higher long-term satisfaction. Interestingly, this study also concluded that undergoing 3 or more MMS stages was associated with higher short- and long-term satisfaction, likely secondary to perceived effects of increased overall care, medical attention, and time spent with the provider.[20]

Synthesis of this information with emphasis on the higher evidence-based studies—including systematic reviews, metanalyses and randomized controlled trials—yields the following beneficial interventions regarding patient education and communication[13-20]:

- Preoperative and same-day postoperative telephone follow-up (TFU) do not show statistically significant impacts on patient satisfaction; however, TFU allows for identification of postoperative concerns and inadequate pain management, which may have downstream effects on long-term perception of the overall patient experience.
- The use of video-assisted consent yields improved patient satisfaction and knowledge, while video content—traditional or didactic—has no impact on satisfaction in new MMS patients.
- The use of at-home or same-day in-office preoperative educational videos can improve procedural knowledge and risk-benefit understanding of MMS while having no impact on satisfaction.
- Bedside manner and effective in-person communication by the provider often takes precedence in the patient experience; however, implementation of additional educational modalities should be considered.

Patient Anxiety and QOL

Reducing Patient Anxiety—The use of perioperative distractors to reduce patient anxiety may play an integral role when patients undergo MMS, as there often are prolonged waiting periods between stages when patients may feel increasingly vulnerable or anxious. Table 4 reviews studies on perioperative distractors that showed a statistically significant reduction in MMS patient anxiety.[21-24]

Although not statistically significant, additional studies evaluating the use of intraoperative anxiety-reduction methods in MMS have demonstrated a downtrend in patient anxiety with the following interventions: engaging in small talk with clinic staff, bringing a guest, eating, watching television, communicating surgical expectations with the provider, handholding, use of a stress ball, and use of 3-dimensional educational MMS models.[25-27] Similarly, a survey of 73 patients undergoing MMS found that patients tended to enjoy complimentary beverages preprocedurally in the waiting room, reading, speaking with their guest, watching television, or using their telephone during wait times.[28] Table 5 lists additional perioperative factors encompassing specific patient and surgical characteristics that help reduce patient anxiety.[29-32]

Patient QOL—Many methods aimed at decreasing MMS-related patient anxiety often show no direct impact on patient satisfaction, likely due to the multifactorial nature of the patient-perceived experience. A prospective observational study of MMS patients noted a statistically significant improvement in patient QOL scores 3 months postsurgery (P=.0007), demonstrating that MMS generally results in positive patient outcomes despite preprocedural anxiety.[33] An additional prospective study in MMS patients with nonmelanoma skin cancer concluded that sex, age, and closure type—factors often shown to affect anxiety levels—did not significantly impact patient satisfaction.[34] Similarly, high

TABLE 3. Studies Evaluating Various Educational Modalities in MMS Patient Consent

Reference (year)	Findings
Migden et al[13] (2008)	High-definition video modules delivering informed consent and instructions regarding postoperative wound care vs nurse demonstration of wound care resulted in increased efficiency and patient comprehension (91.6% vs 84.0% on a postvideo quiz) while maintaining patient satisfaction levels
Newsom et al[14] (2018)	Use of traditional video consent (more didactic in nature) was compared to narrative video consent, including footage of MMS, tissue processing, and patient testimonials. There was no statistical difference (P=.92) in video preference or satisfaction between the 2 videos groups, despite existing MMS patients having a preference for the narrative format (P=.01)
West et al[15] (2020)	Use of an educational video to supplement traditional patient consent in first-time MMS patients resulted in improved patient perceptions regarding procedural understanding (P=.038) and the opportunity to ask questions (P=.003), despite no impact on overall patient satisfaction levels (P=1)
Miao et al[16] (2020)	Patients undergoing video-assisted consent vs standard verbal consent scored higher on knowledge questionnaires (P=.02), exhibited improved understanding regarding procedural risks (P=.013), and demonstrated decreased overall physician consultation time (P=.008), all without compromising patient satisfaction levels (P=.08)

Abbreviation: MMS, Mohs micrographic surgery.

satisfaction levels can be expected among MMS patients undergoing treatment of melanoma in situ, with more than 90% of patients rating their treatment experience a 4 (agree) or 5 (strongly agree) out of 5 in short- and long-term satisfaction assessments (38/41 and 40/42, respectively).[35] This assessment, conducted 3 months postoperatively, asked patients to score the statement, "I am completely satisfied with the treatment of my skin problem," on a scale ranging from 1 (strongly disagree) to 5 (strongly agree).

Lastly, patient perception of their surgeon's skill may contribute to levels of patient satisfaction. Although suture spacing has not been shown to affect surgical outcomes, it has been demonstrated to impact the patient's perception of surgical skill and is further supported by a study concluding that closures with 2-mm spacing were

TABLE 4. Perioperative Distractors Demonstrating a Statistically Significant Decrease in MMS Patient Anxiety

Reference (year)	Findings
Vachiramon et al[21] (2013)	Demonstrated a reduction in patient anxiety scores with the use of intraoperative patient-selected music ($P<.001$), with greater reduction in score seen in first-time MMS patients on subgroup analysis
Hawkins et al[22] (2018)	Demonstrated a 19% (n=46) decrease in anxiety levels ($P=.00062$) in patients who viewed perioperative consent and wound care informational videos vs informational text messages or text messages in conjunction with videos
Higgins et al[23] (2019)	Use of a 10-min virtual-reality experience composed of relaxing scenes with minimal sensory stimulation following the first MMS layer removal demonstrated statistically significant reductions in anxiety for the following patient questions: "Are you currently feeling unable to relax?" ($P=.0013$), "Are you currently feeling fear of the worst happening?" ($P<.0001$), "Are you currently feeling terrified or afraid?" ($P=.0046$), and "Are you currently feeling nervous?" ($P<.0001$)
Guo et al[24] (2023)	Demonstrated a sustained reduction in preprocedural anxiety levels with single-dose 5-mg diazepam ($P=.03$) as well as reduced early anxiety ($P=.02$) with 1200-mg gabapentin vs placebo; no significant difference was seen with the use of alprazolam ($P=.08$), lorazepam ($P=.73$), pregabalin ($P=.53$), or melatonin ($P=.24$)

Abbreviation: MMS, Mohs micrographic surgery.

TABLE 5. Additional Perioperative Factors Related to MMS Patient Anxiety

Reference (year)	Findings
Kossintseva and Zloty[29] (2017)	MMS patients demonstrated equal or greater cancer-related anxiety as compared to cosmesis-related anxiety postoperatively, with younger age ($P=.025$) and female sex ($P=.010$) being predictors of cosmesis-related anxiety and use of preoperative lorazepam being a predictor of cancer-related anxiety ($P=.044$)
Kruchevsky et al[30] (2021)	Increased perioperative anxiety was associated with female sex ($P<.001$), younger age ($P<.001$), lack of chronic diseases/healthy patients ($P=.003$), first-time MMS patients ($P<.001$), centrally located facial tumors ($P<.001$), prior biopsy or excision with positive margins ($P=.009$), and anticipated closure by a flap or skin graft ($P<.001$); there was no correlation to tumor size ($P=.3$), appearance ($P=.1$), or referring provider ($P=.13$)
Kokoska et al[31] (2022)	Younger age ($P=.0001$), female sex ($P=.007$), and previously diagnosed anxiety disorder ($P=.011$) increased preoperative patient anxiety, whereas increased MMS layers ($P=.005$) and higher pre-MMS anxiety ($P<.001$) increased postoperative patient anxiety
Long et al[32] (2022)	Increased perioperative anxiety was associated with eyelid location vs noneyelid facial regions and nonfacial regions ($P\leq.05$); increased perioperative anxiety was seen in patients with a college-level degree or lower vs those with graduate degrees ($P\leq.05$); higher perioperative anxiety had larger impacts on patient QOL ($P\leq.05$)

Abbreviations: MMS, Mohs micrographic surgery; QOL, quality of life.

ranked significantly lower by patients compared with closures with either 4- or 6-mm spacing (P=.005 and P=.012, respectively).[36]

Synthesis of this information with emphasis on the higher evidenced-based studies—including systematic reviews, meta-analyses, and randomized controlled trials—yields the following beneficial interventions regarding anxiety-reducing measures and patient-perceived QOL[21-36]:

- Factors shown to decrease patient anxiety include patient personalized music, virtual-reality experience, perioperative informational videos, and 3-dimensional–printed MMS models.
- Many methods aimed at decreasing MMS-related patient anxiety show no direct impact on patient satisfaction, likely due to the multifactorial nature of the patient-perceived experience.
- Higher anxiety can be associated with worse QOL scores in MMS patients, and additional factors that may have a negative impact on anxiety include female sex, younger age, and tumor location on the face.

Conclusion

Many factors affect patient satisfaction in MMS. Increased awareness and acknowledgement of these factors can foster improved clinical practice and patient experience, which can have downstream effects on patient compliance and overall psychosocial and medical well-being. With the movement toward value-based health care, patient satisfaction ratings are likely to play an increasingly important role in physician reimbursement. Adapting one's practice to include high-quality, time-efficient, patient-centered care goes hand in hand with increasing MMS patient satisfaction. Careful evaluation and scrutiny of one's current practices while remaining cognizant of patient population, resource availability, and clinical limitations often reveal opportunities for small adjustments that can have a great impact on patient satisfaction. This thorough assessment and review of the published literature aims to assist MMS surgeons in understanding the role that certain factors—(1) perioperative patient communication and education techniques and (2) patient anxiety, QOL, and additional considerations—have on overall satisfaction with MMS. Specific consideration should be placed on the fact that patient satisfaction is multifactorial, and many different interventions can have a positive impact on the overall patient experience.

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