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Systematic Review of the Literature for Jewelry and Body Piercing in the Operating Room

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Abstract

Background and Objectives: Questions were raised regarding best practice for jewelry and body piercing removal for operating room and procedure room patients in an ambulatory surgery unit. Surgical providers and anesthesia providers did not always agree with jewelry or body piercing removal requirements. The Unit Practice Council was tasked with reviewing best practices for jewelry and body piercing removal before surgery, or to leave jewelry and body piercings in place. **Methods:** The Unit Practice Council assigned a small task group consisting of two operating room nurses and a perianesthesia care unit nurse. This group conducted a systematic review of the literature for jewelry and body piercing in the operating room. The PICOT question was direct: What is best practice for jewelry or body piercings in the operating room (to require removal or not)? **Results:** Searches of Joanna Briggs Institute, CINAHL Ultimate, CINAHL Plus, EBSCOhost E-book Complete, and Eric Medline, and known sources including the Association of Perioperative Registered Nurses and perianesthesia nursing publications. There were 38 usable sources; however, with grading the evidence, most articles were "expert opinion". There were 3 Level 1 results, which are national guidelines based on evidence. Airway's concerns with jewelry and body piercings are among the themes that have been identified the most in the literature. 32 authors indicated that jewelry or body piercings should be removed. Recommendations within the literature review also included teaching the patients preoperatively not to wear jewelry into the facility, and for staff to know how to remove piercings. Few authors also recommended using a waiver for patients who refused to remove piercings or jewelry, and to proceed with a procedure after the waiver is signed. **Conclusion:** With these findings the group has recommended that all jewelry and body piercings to be removed prior to arrival to the same day surgery center, to update the preoperative instructions to include removal of body piercings or jewelry prior to arrival for surgery, and

to include the statement in the preoperative instructions, that a procedure may be canceled if the patient is unable to remove jewelry or body piercings. Staff will monitor compliance with the removal of jewelry and body piercings prior to arrival, and document cancellations required due to piercings/jewelry.

Keywords

Jewelry, Body Piercing, Surgery, Operating Room, Evidence-Based Practice

1. Background

The need to remove jewelry prior to surgery or a procedure has been recognized as early as the 1940s by the military [1]. However, different organizations may struggle with what is best practice for the removal of jewelry and body piercings due to many factors, including the resistance of some patients to remove jewelry/piercings [2]. Some patients express concerns that removal of body piercings may cause piercing sites to close, specifically tongue piercings and piercings that are new [3]. Nurses and providers may not be aware of the cultural, social, or religious importance of jewelry or body piercing [3]-[8]. Providers may voice concern that facial jewelry/piercings and maintenance of airways are of significant concern when left in place during anesthesia or a procedure [2]-[5] [8]-[25]. Others are noncommittal about jewelry/body piercing removal, or emphasize it does not need to be removed [2] [3] [7]-[9] [14] [25].

The current Standard Operating Procedure (SOP) in a small same-day surgery center did not include information regarding the removal of jewelry prior to a procedure. A patient was admitted to the surgery center, while discussing the anesthesia plan, the patient refused to remove a nasal piercing. The anesthesia providers educated the patient regarding the risks if the piercing/jewelry was left in and concluded that it would be unsafe to administer a general anesthesia with the nose ring in place. The patient refused to remove the nose ring, and the elective procedure was canceled. After this event, a surgeon requested a review of best practices for jewelry and body piercings in the Operating Room (OR)/Surgery/Procedure rooms of the medical center. The provider was aware of the Association of Operating Room Nurses Guidelines (AORN); however, they wanted a deeper dive into what the literature as a whole provided as evidence to remove jewelry or to leave it in place.

This request for a review of best practice was presented at the Surgical Services Unit Practice Council. A small team of nurses from the OR and PeriAnesthesia Care Unit (PACU) developed a Problem-Intervention-Comparison-Outcome (PICOT) question. The PICOT question was direct:

What is best practice for jewelry or body piercings in the operating room—to require removal or not?

2. Systematic Review of Literature

2.1. Systematic Review Process

The systematic review was completed using the databases Joanna Briggs Institute (JBI), CINAHL Ultimate and CINAHL Plus with Full Text Search, EBSCOhost E-book Medline Complete, Eric, and AORN Guidelines (Table 1).

Table 1. Databases and organizations searched for evidence.

Databases and Organizations Searched for Evidence

➢ Databases used:
    ➢ Joanna Briggs Institute (JBI)
    ➢ CINAHL Ultimate and CINAHL Plus with Full text search
    ➢ EBSCOhost E-book, Medline Complete, and ERIC
    ➢ AORN Guidelines
➢ Hardy copied resources from specialty organizations were also used.
    ➢ Perianesthesia Nursing Core Curriculum
    ➢ Anesthesia Patient Safety Foundation Newsletter

Specific Search terms included "jewelry, operating room, piercing"; "jewelry anesthesia" and "Jewelry surgery piercing". Table 2 outlines inclusion and exclusion criteria.

Table 2. Search terms and exclusion criteria.

Search Terms and Combinations	"jewelry" "operating room" "piercing"	"jewelry" "anesthesia"	"jewelry" "surgery" "piercing"
Inclusion Criteria	Mentions jewelry and body piercing related to: • surgery, procedures, • complications or • preoperative/preprocedural care.	Mentions jewelry and body piercing related to: • surgery, procedures, • complications • preoperative/preprocedural care.	Mentions jewelry and body piercing related to: • surgery, procedures, • complications • preoperative/preprocedural care.
Exclusion Criteria	• Jewelry or body piercings of staff. • Does not include information about jewelry related to procedure or surgery for patient; or complications related to jewelry and body piercings. • Non-English language.	• Jewelry or body piercings of staff. • Does not include information about jewelry related to procedure or surgery for patient; or complications related to jewelry and body piercings. • Non-English language.	• Jewelry or body piercings of staff. • Does not include information about jewelry related to procedure or surgery for patient; or complications related to jewelry and body piercings. • Non-English language*.

*There were no discrepancies among reviewers for the inclusion of sources identified that met the inclusion criteria. All had included an article that the abstract looked good, and then, with a review, all found it did not discuss preoperative jewelry or body piercings, and organizations began.

Table 3 includes all results identified that met the inclusion criteria, and from which database search they came.

Table 3. Systematic review sources, findings, and limitations.

	Reference	Evidence Type	Methodology	Sample/Setting Number Characteristics Exclusion Criteria Attrition	Variable Independent or Dependent	Outcome Measured: What scales were used/ reliability (alpha)	Findings: What statistics were used	Level of Evidence	Quality of Evidence: Strengths and limitations
EBSCOhost CINAHL Ultimate jewelry AND operating room AND piercing	Fogg, D. (2003) AORN Journal; Feb 2003; 77(2): 426-433. Clinical Issues. Body piercings in the OR.	Expert Opinion to the Editor	N/A	N/A	N/A	N/A	Staff cover jewelry, change masks every two hours, and keep confined. Concern could come out or if shed skin/bacteria.	7	Opinion only, no specific guideline at that time.
	O'Neale, M. (1997) Body piercing jewelry. AORN Journal, Clinical Issues. 1997 Feb; 65(2): 422-426	Editor Question and Answer AORN	N/A	N/A	N/A	N/A	Some facilities cancel if patient jewelry is not removed; others require to sign waivers that release facility and employees from liability if patients will not or cannot remove jewelry from body piercing. Older cautery may seek the piercing if jewelry is in tape jewelry or bandage and tape.	7	No citations, expert opinion
	Bartlett, G.E., Pollard T.C.B., Bowker, K.E., *et al.* (2002) Journal of Hospital Infection, 2002 Sep; 52(1): 68-70.	Single Qualitative Study	Swab sites of participants	20 staff and local piercing parlour clients	Swab nose, ear, or ring sites. ($P < 0.0001$)	Infection or non-infection of sites	The National Association of Theatre Nurses NATN guidelines are to remove all jewelry before surgery. Findings of the study showed the lowest bacterial count in control areas of skin, highest counts under jewelry, with "the bacterial counts on the skin beneath finger and nose rings were nine times greater than on the respective jewelry surfaces, and 21 times greater in earrings.	6	Small sample size does not list limitations, not specific to patients
	Fogg, D.M. (1999) Clinical Issues. Body piercing. AORN Journal, Jul 99; 70(1): 120-124.	Expert Opinion question answer	N/A	N/A	N/A	N/A	Patients resist removal, policy states to remove. Concern for burn, lost in bed, can use ring spreader, cutting off is not recommended. Some facilities cancel if not removed. Instructions state patient is responsible to remove all prior to the date of surgery, remind in preop call.	7	Expert opinion, no references except AORN citation
CINAHL Ultimate jewelry AND anesthesia AND piercing	Durkin, S.E. (2012) Tattoos, body piercing, and healthcare concerns. Journal of Radiology Nursing, Mar 2012; 31(1): 20-25.	Expert opinion	N/A	N/A	N/A	N/A	Piercings found anywhere, complete health and physical assessment at admission, examine hidden areas if left on, difficulty with placement of cervical collar or urinary catheter; burn with electrocautery. Remove jewelry and insert retainer/catheter or cover with clear occlusive dressing. Some are concerned about aspiration, and others say that if they "can walk, talk, and sleep with tongue jewelry in place, they can probably be intubated with it" (page 23).	7	Some citations, no limitations listed.
	DeBoer, S., McNeil, M. and Amundson, T. (2008) AANA Journal, Feb 2008; 76(1): 19-23.	Expert Opinion	N/A	N/A	N/A	N/A	Noncommittal about whether should remove or not; Cite literature review of case reports related to airway issues with leaving jewelry in. No reports of poor seal with ventilation for patients with facial airway piercings. One tongue infection postop and one tongue edema with intubation noted.	7	Limited literature review; does site case studies.
CINAHL Ultimate Jewelry and surgery AND piercing	Ham, M. (2021) A piercing paradigm: a healthcare providers guide to the care of individuals with body piercing and body modifications. Journal of PeriAnesthesia Nursing, Aug 2021; 36(4): e2025-326. doi.org/10.1016/j.jopan.2021.06.076	ASPAN Conference Abstract 2021	N/A	N/A	N/A	N/A	Reviewed literature on how to remove jewelry included in literature, use plastic intravenous catheter to maintain piercing tract. Concern is complications. Enhance nursing knowledge of appropriate care.	7	No References provided

Continued

Van Hoover, C., Rademayer, C.A. and Farley, C.L. (2017) Body piercing: motivations and implications for health. Journal of Midwifery & Women's Health, Sep/Oct 2017; 62(5): 521-531.	Expert Opinion	N/A	N/A	N/A	N/A	Health providers should be familiar with how to remove. Oral piercings, including the tongue, can affect dental health; orofacial jewelry may interfere with intubation or be aspirated; Recommended that all body jewelry be removed prior to procedure, nonmetallic jewelry can be purchased from a piercer to safely preserve the tract.	7	Opinion, not many references, more focused on cultural context rather than surgical
Dunn, D. (2016) Body art and the perioperative process. AORN Journal, Oct 2016; 104(4): 326-340.	Continuing education AORN	N/A	N/A	N/A	N/A	Communicate body art preoperatively to all perioperative team, including anesthesia and surgeon. Be nonjudgmental and culturally sensitive manner; nurses need to become familiar with the various forms of body modification so they may provide care with empathy. Patients are more likely to be engaged in their care and share the location of hidden piercings if they feel accepted. Begin discussion in preop phone call/provider office. Preop assesses for infection and debris; knows how to remove jewelry. If jewelry is assessed for possible pressure injury, or catheter insertion difficulty with genital piercings. If the patient refuses to remove jewelry, information about possible complications is shared. Patients remove and reinsert themselves. *If a policy does not exist regarding a patient's refusal to remove jewelry or hardware, the nurse should contact the risk manager for guidance, a policy should be written to avoid future issues. Consider burns with cautery. Anesthesia considerations: facial, nasal, and oral piercings can get in the way of effective mask seal during supportive oxygenation; tongue piercings or facial piercings can act as a foreign body, cause dental trauma, or cause gum or soft tissue injury, so remove for both safety reasons and medical-legal risks to the anesthesia care providers and the organization. Assess piercing sites postoperatively, patients should replace their jewelry themselves, and only after they are fully awake.	7	Only 7 citations; discusses psychosocial and cultural concerns; A lot of focus on nurse preoperative care is positive; lots of specific recommendation, some linked to AORN guidelines at the time of writing
Govers, D. (2016) What happens if it won't come out? Dissector, Sep 2016; 44(2): 27-30.	Literature Review	N/A	N/A	N/A	N/A	Body art is a unique challenge in maintaining patient safety; it is for self-expression, and plays a role in protecting the patient with permanent piercings and implants, the implications, and medico-legal issues for non-removal of these permanent body modifications. In the past, patients were expected pt remove all jewelry, today, with sub-dermal, micro-dermal and trans-dermal piercings and implants removal is not possible, necessary, or potentially desirable for the pierced individual. Electrosurgery risk, intubation risk positioning risks, genital piercings, and catheterization. Infected or inflamed piercings could be a problem for infection; notify provider and anesthesia team. Some pts may be embarrassed to discuss, especially if intimate location. Document discussion with pt about the risks of keeping piercings.	7	20 references; New Zealand provider

Continued

	Vidra, D. and Kirchner, B. (2012) Protect patients with piercings. Outpatient Surgery, Dec 2012; 13(12): 148-150.	Patient Safety Article AORN expert opinion	N/A	N/A	N/A	N/A	Facility policy for jewelry should be straightforward: patients must have it removed before they arrive to facility. Concern burns; If patients refuse to remove piercings, have them sign a waiver that indicates they've been told of the dangers their piercings pose and chose to ignore your warnings. Include surgeon and anesthesia in conversation. Piercer should reinsert; policy should state that no item can be kept in the body that might conduct electricity, and your facility isn't responsible for any damage that might occur to items during removal. Don't reinsert jewelry postop—patients return to professional piercers. Dermal anchors aren't implants which live totally under the dermis with no outside expo-sure. They can be taken out, regardless of what a patient might tell you.	7	No citations, all expert opinion
	DeBoer, S., Seaver, M., Angel, E. and Armstrong, M. (2009) Puncturing myths about body piercing and tattooing. Nursing Made Incredibly Easy! May/June 2009; 7(3):34-39.	Opinion	N/A	N/A	N/A	N/A	States removal of all jewelry preop is a myth—States jewelry designed to stay in place, Tongue and piercings can close quickly the patient can insert a flexible plastic barbell or retainer; did say four case reports successful bag valve mask ventilation, LMA placement or intubation with tongue jewelry while 3 articles detail complications of nasal surgery displacement. "If the patient can eat, talk and sleep with tongue jewelry in place, he can probably be intubated with it in place as well".		Opinion, no intext citations; does list some references for more information at end
	Muensterer, O.J. (2004) Temporary removal of navel piercing jewelry for surgery and imaging studies. Online Journal Pediatrics, Sep 2004 Supplement; 114(3): e384-6.	Expert Opinion	N/A	N/A	N/A	N/A	Focus is on how to remove for procedures. Navel rings removed preoperatively with specific technique, then reinserted Postprocedure. No complications. Similar method for tongue rings used. Problem with plastic spacers is not sterile concern with infection.	7	Twelve citations, points to ease of removal by staff/ provider
	Larkin, B.G. (2004) Home Study Program: The ins and outs of body piercing. AORN Journal, Feb 2004; 79(2): 330-346.	AORN Home Study Course	N/A	N/A	N/A	N/A	Consider physiological, psychological, and cultural aspects of care. Measures must be taken to remove this jewelry, as with other traditional jewelry to prevent burns; jewelry in and around mouth must be removed to avoid aspiration during intubation. Even when no cautery should remove jewelry from around mouth or surgical site because of concern with pressure injuries; genitalia piercings May interfere with urinary catheterization. Staff should be prepared to remove—consider a place keeper for a piercing if needed; use specific tools.	7	2004; 11 references
	Ackerson, B. and Tarr, W.M. (2001) Body jewelry isn't a good accessory for surgery: Patient safety requires removal in many cases. Same-Day surgery, Dec 2001; 25(12): 146-147.	Expert opinion	N/A	N/A	N/A	N/A	Patient concern difficult to put back. Many patients reluctant to remove, assess cases individually to determine jewelry risk; emphasize safety to patient; keep tools to remove jewelry; be prepared to cancel surgery if patient won't allow removal of jewelry and you have determined that there is a risk. Ask about jewelry anywhere, explain risks and why must remove it. Use proper tools to remove.	7	No references, interview with two nurses
Ovid JBI "jewelry" "operation room" "piercing" limit 5 years English	JBI Recommended Practice (2022) Electrosurgery in the Perioperative Setting: Safe use in Operating theater. JBI EBP Database.	JBI Recom-mended Practice	N/A	N/A	N/A	N/A	Ensure that patient's metallic jewelry/body piercings are removed/taped. The patient's skin should not be in the contact with any metal surfaces.	7	Linked to one supporting evidence summary

Continued

	JBI Evidence Summary Johal, Jolyn (2022) Surgical Site Infection: Surgical scrubbing, gowning, and gloving. JBI EPB Database.	JBI Evidence Summary	N/A	N/A	N/A	N/A	Jewelry from the wrists or hands should be removed before operations.	7	5 citations including AORN Guidelines
	JBI Evidence Summary Valdez, F.C. (2022) Electrosurgical equipment in the perioperative setting: Safe use. JBI EBP Database.	JBI Evidence Summary	N/A	N/A	N/A	N/A	Insulate patient against all electrically conductive parts and avoiding patient contact from other metal.	7	List types of evidence, studies that include pediatrics
Ovid JBI "jewelry" "anesthesia" "piercing" limit 5 years English	JBI Recommended Practice Pre-Operative preparation: Nursing care (2022) JBI EBP Database.	JBI Recom-mended Practice	N/A	N/A	N/A	N/A	Tape rings with 2cm of adhesive tape over the dorsal aspect of finger.	7	Supporting evidence listed as surgical patients' preoperative education, no other references
Ovid JBI "jewelry" "surgery" "piercing" limit 5 years English	Quieroz, Ana Beatriz. Day Surgery: Pre-Admission care. 2022. JBI EBP Database.	Removed nothing about jewelry in preadmission care!							
EBSCOhost eBook, Medline Complete and ERIC	Mercier, F.J .and Bonnet, M.P. (2009) Tattooing and various piercing: anaesthetic considerations. Current Opinion in Anaesthesiology 2009, 22: 436-441.	Expert Opinion "Proposal" for anesthesia	N/A	N/A	N/A	N/A	Describe complication noted in other evidence found include airway problems, bleeding from piercing, also dental trauma if bite on piercing. Case where nose ring taped NG tube inserted, the ring got caught on NG tube, removed it, not discovered until after. Concern of burn with electrocauterization, infection at site can spread. Suggest oral and nasal piercings be removed even with regional anesthesia in case turns into a general—case happened in review of literature, every piercing recorded, if patient refuses can put in plastic sleepers or catheter, but these are not radiopaque, tape piercing if left in, evaluate at end of procedure. Know how to remove.	7	Combined case studies
	Holak, E.J., Schiller, E.D. and Pagel, P.S. Another potential anesthetic implication of body piercing. Journal of anesthesia. 2010; 24(1): 152-153. doi:10.1007/s00540-009-0864-y	Letter to Editor/Case Presentation	N/A	N/A	N/A	N/A	Patient told to remove jewelry, did not, bilateral nipple rings found in OR, patient was going to be placed prone, concern about pressure injury—needed to find someone to remove, anesthesia did not know how. Rings removed, reinserted after procedure. Most focus on airway or bleeding concerns, also concern for burn or bacterial infection spread; anesthesia personnel know how to remove. No specific informed consent for removal of body piercings is required.	7	Letter opinion
	Kuczkowski, K.M., Benumof, J.L. Tongue piercing and obstetric anesthesia: is there cause for concern? Journal of clinical anesthesia. 2002; 14(6): 447-448. doi:10.1016/s0952-8180(02)00376-8	Expert opinion	N/A	N/A	N/A	N/A	Trauma to tongue from tongue piercing and difficulty airway management for emergency postpartum surgery, from tongue edema unable to ventilate; unable to remove prior due to patient hemorrhaging. Debatable if all jewelry needs removed prior to surgery, however, if oral airway jewelry in then anticipate problems of edema, bleeding, aspiration of hardware or airway obstruction if left in.	7	

Continued

	Kuczkowski, K.M., Benumof, J.L., Moeller-Bertram, T. and Kotzur, A. An initially unnoticed piece of nasal jewelry in a parturient: implications for intraoperative airway management. Journal of clinical anesthesia. 2003; 15(5): 359-362. doi:10.1016/s0952-8180(03)00021-7	Case Study	N/A	N/A	N/A	N/A	Nasal piercing: Threat of aerodigestive tract aspiration. Backing was missing, needed x-rays, etc., found, backing was not worn. Now ask to remove for safety.		Expert opinion/ case example
	Kluger, N. Body art and pregnancy. European journal of obstetrics, gynecology, and reproductive biology. 2010; 153(1): 3-7. doi:10.1016/j.ejogrb.2010.05.017	Expert Opinion	N/A	N/A	N/A	N/A	Clitoral piercings okay for c-section; oral and nasal piercing concern of aspiration or airway management problem—remove all jewelry in case of emergency.	7	42 references, only one author
	Boucek, C.D. More on nasal jewelry. Journal of clinical anesthesia. 2004; 16(5): 396. doi:10.1016/j.jclinane.2004.06.002	Expert Opinion	N/A	N/A	N/A	N/A	Concern if pt removes jewelry and inserts something else like matchstick may have other problems.	7	Letter to editor, present case, no citations except refer to previous article
	Dhir, S. and Dhir, A.K. Intraoperative loss of nasal jewelry: anesthetic concerns and airway management. Journal of clinical anesthesia. 2007; 19(5): 378-380. doi:10.1016/j.jclinane.2006.10.014	Expert Opinion	N/A	N/A	N/A	N/A	Pt refused to remove jewelry, jewelry taped, with NG tube insertion the nose ring went with it and stuck to tube. Now practice requires remove all jewelry—risks of airway/digestive tract aspiration, bleeding trauma and edema – can use plastic sleeper to keep piercing open.	7	Case Report, few citations, direct without recommendations of specific sleepers
	Jacobs, V.R., Morrison, J.E., Paepke, S. and Kiechle, M. (2004) Body piercing affecting laparoscopy: Perioperative precautions. The American Association of Gynecological Laparoscopists, November 2004; 11(4).	Observational clinical study	observational	2001-2004 21 had umbilical piercing	Umbilical piercing: what occurred post procedure—no infection noted, no stats on how many did not follow directions	21 umbilical piercings removed preop; no infections post laparoscopy —even though some patients did not follow directions and put back in immediately postop	Several took off wound dressing to put in jewelry upon awakening, even though instructed not to do so. Concern that umbilical piercing known for healing problem Concern with oral airway with other piercings. Should remove. Anesthesia may remove to provide anesthesia if not removed. Could consider placer, but those are not easily found. Patients should agree on an informed consent basis preoperatively to take full responsibility in case of ay perioperative complications caused by non-removal. Remove body piercings, know how to remove.	6	Small sample size, no statistics provided. Good information that the umbilical ring did not increase risk for infection for laparoscopy
	Blumenstein, N., Wickemeyer, J. and Rubenfeld, A. (2022) Bringing to light the risk of burns from retained metal jewelry piercings during electrosurgery—Torching myth. JAMA Surgery, May 2022; 157(5), 455-456.	Expert Opinion	N/A	N/A	N/A	N/A	AORN recommends removal of metal jewelry piercings prior to surgeries that use cautery, specifically if they are between the active electrode (Bovie tip) and the grounding pad. Concern is burn. Jewelry removal eliminates risk.	7	Expert opinion: piece specific to how cautery works. And now less risk with type of cautery used
AORN Guidelines	Guidelines for perioperative practice (2021-2024) Positioning the patient. Assessment for injury risk.	National Guideline	N/A	N/A	N/A	N/A	Remove all jewelry to prevent injury.	1	Strong evidence, supported, cited

Continued

	Guidelines for perioperative practice (2021-2024) Pressure injury prevention: Preoperative risk assessment.	National Guideline	N/A	N/A	N/A	N/A	Presence of jewelry may cause injury, burn, or airway.	1	Strong evidence, supported, cited
	Guidelines for perioperative practice (2021-2024) Electrosurgical safety: injury prevention.	National Guideline	N/A	N/A	N/A	N/A	Risk for thermal injury: remove jewelry.	1	Strong evidence, supported, cited
Medline Plus	MedlinePlus [Internet]. Bethesda (MD): National Library of Medicine (US); [updated 08/22/22]. The day of your surgery. Retrieved from: https://medlineplus.gov/ency/patientinstructions/000578.htm	Patient Instruction Handout	N/A	N/A	N/A	N/A	Take off jewelry. Remove body piercings.	7	Medline recommendation: weakness is only 2 references
	The Military Service Publishing Company (1941). Medical Soldier's Handbook. Harrisburg, Pennsylvania.	Federal Recommendation	N/A	N/A	N/A	N/A	All artificial parts must be removed; this includes false teeth and dentures. Remove all jewelry and turn it over to the responsible officer.	7	Dated 1941, no references
By hand	Byrne, M.S. (2024) If looks could kill: Anesthetic implications of cosmetic enhancements. APSF Newsletter. 2024; 39: 31-34.	Expert Opinion	N/A	N/A	N/A	N/A	Harm: site burn, edema from compressive injury, item dislodgment. Remove before surgery, tape may reduce risk of loss but not burn, can remove permanent jewelry try to maintain chain integrity. Concern of laryngospasm if mouth.	7	Supporting evidence, foundation's newsletter; however, no organizational vote
Book	Schick, L. and Windle, P. (2021) Perianesthesia Nursing Core Curriculum: Preprocedure, phase I and phase II PACU nursing, 4th edition. Elsevier: St. Louis, Missouri.	Expert Opinion	N/A	N/A	N/A	N/A	Remove all jewelry.	7	National textbook for Perianesthesia Nursing, 4th edition, weakness not cited
From References or Cited by links	Wise, H. (1999) Hypoxia caused by body piercing. Anaesthesia, 54: 1129-1129. doi.org/10.1046/j.1365-2044.1999.01202.x	Case presentation	N/A	N/A	N/A	N/A	Elective laparoscopic gynaecological procedure—developed laryngospasm and hypoxia; required positive airway pressure via bag mask. Cough after extubation, oral suction had blood-stained secretions in oropharynx; tongue showed small tear adjacent to tongue study. Patient had removed other piercing but not tongue stud. Question if should provide anesthesia with tongue studs in place due to risk.	7	Strength case that happened, showing concern, limitations one case
	Holbrook, J. Minocha, J. and Laumann, A. (2012) Body Piercing Complications and prevention of health risks. American Journal Clinical Dermatology 2012; 13(1): 1-17	Review of Literature	N/A	N/A	N/A	N/A	Concern with burns orofacial piercings risk of swallowing, aspiration, bleeding, trauma, and edema. Reports of hypoxia laryngospasm, bleeding, ingestion. Important to remove jewelry before procedure. Know how to remove. Can insert plastic retainer piece	7	Review of literature; no national guidelines all evidence is case studies

Table 4 outlines all identified themes and levels of evidence.

Table 4. Systematic review of literature for jewelry and body piercing results.

Themes identified	Airway Concern	Burn	Tape jewelry	Remove Jewelry/ metal	Don't have to remove jewelry/ noncommittal	Develop SOP/Policy	Sign Waiver /pt aware com-plications	Difficult Catheter insertion	Pressure Injury	Empathy, cultural awareness/ Nursing knowledge	Infection/ bacteria	May Cancel if not remove	Instruct remove preop prior to arrival	Could lose intra-op	Insert catheter/or piercer put in sleeper	Know how to remove	Do not reinsert post op	Post op assessment of jewelry	Use alternate technology: bipolar cau-tery	Provide pa-tient educa-tion preop: why
1	X	X		X							X	X	X	X		X				
2	X	X		X					X		X									
3		X		X			X											X	X	X
4	X	X		X							X									
5				X	X						X									
6		X	X	X								X				X				
7	X									X				X				X	X	X
8	X	X	X	X			X		X				X	X	X	X				
9	X			X	X					X	X			X	X	X				
10	X	X	X	X	X	X				X	X			X	X	X				X
11	X		X	X	X					X			X	X	X			X	X	X
12	X	X	X	X		X	X	X	X	X	X	X	X	X		X				
13	X	X	X	X	X		X	X	X	X	X		X		X	X			X	
14		X	X	X																X
15											X									
16				X		X			X		X	X				X		X	X	
17	X	X	X	X	X		X	X	X	X	X				X	X				
18		X								X					X	X				
19	X	X		X			X		X		X		X		X	X				
20	X	X		X							X				X	X				
21	X	X	X	X		X	X			X	X	X	X	X	X	X	X			
22				X																
23	X			X									X	X		X				
24	X			X					X											
25	X						X		X				X			X				
26	X	X		X				X	X	X				X	X	X				
27				X									X							X
28	X	X		X					X	X	X			X	X	X				
29		X		X						X	X				X	X				
30		X	X	X			X					X		X						
31			X	X																
32		X	X	X																
33				X																
34		X	X	X															X	X
35	X	X		X							X				X	X				
36	X	X				X	X						X		X		X			
37	X			X	X					X			X						X	
Totals	22	23	13	32	7	5	10	4	11	13	17	6	12	12	15	19	2	4	7	7

*Orange highlight most common themes identified; highlight in purple is level 1 evidence; highlight in yellow is level 6 evidence; no highlight level 7 evidence based on Evidence Based Practice Pyramid (https://library.commonwealthu.edu/home). 1. Ackerson, B. and Tarr, W.M. (2001) Body jewelry isn't a good accessory for surgery: Patient safety requires removal in many cases. Same-Day surgery, Dec 2001; 25(12): 146-147. 2. AORN Guidelines for perioperative practice (2021-2024) Positioning the patient. Assessment for injury risk. 3. AORN Guidelines for perioperative practice (2021-2024) Electrosurgical safety: injury prevention. 4. AORN Guidelines for perioperative practice (2021-2024) Pressure injury prevention: Preoperative risk assessment. 5. Bartlett, G.E., Pollard, T.C.B. and Bowker, K.E., *et al.* (2002). 6. Blumenstein, N., Wickemeyer, J. and Rubenfeld, A. (2022). 7. Boucek, C.D. (2004). 8. Byrne, M.S. (2024). 9. DeBoer, S., McNeil, M. and Amundson, T. (2008). 10. DeBoer, S., Seaver, M., Angel, E. and Armstrong, M. (2009). 11. Dhir, S. and Dhir, A.K. (2007). 12. Dunn, D. (2016). 13. Durkin, S.E. (2012). 14. Electrosurgery in the Perioperative Setting: Safe use in Operating theater (2022). 15. Fogg, D.M. (1999). 16. Fogg, D. (2003). 17. Govers, D. (2016). 18. Ham, M. (2021). 19. Holak, E.J., Schiller, E.D. and Pagel, P.S. (2010). 20. Holbrook, J., Minocha, J. and Laumann, A. (2012). 21. Jacobs, V.R., Morrison, J.E., Paepke, S. and Kiechle, M. (2004). 22. Johal, J. (2022). 23. Kluger, N. (2010). 24. Kuczkowski, K.M., Benumof, J.L., Moeller-Bertram, T. and Kotzur, A. (2003). 25. Kuczkowski, K.M. and Benumof, J.L. (2002). 26. Larkin, B.G. (2004). 27. MedlinePlus [Internet]. Bethesda (MD): National Library of Medicine (US); [updated 08/22/22]. 28. Mercier, F.J. and Bonnet, M.P. (2009). 29. Muensterer, O.J. (2004). 30. O'Neale, M. (1997). 31. Pre-Operative preparation: Nursing care (2022). 32. Schick, L. and Windle, P. (2021). 33. The Military Service Publishing Company (1941). 34. Valdez, F.C. (2022). 35. Van Hoover, C., Rademayer, C.A., Farley, C.L. (2017). 36. Vidra, D. (2012). 37. Wise, H. (1999).

The search began in Ovid in the Joanna Briggs Institute (JBI) database. This database does not permit the use of AND/OR, or limiters like other databases. The search terms included "jewelry", "operating room", and "piercing". There were 26 results, and adding a limiter of 5 years did not remove any results. 3 out of 26 results met the inclusion criteria of being specific to jewelry or piercings in the operating room. A second search of JBI was conducted with the terms "jewelry", "anesthesia", and "piercing", with 57 results, with a limiter of the past 5 years down to 28 results. With exclusion criteria, there was one repeat from previous results and one new result that were usable. Exclusion criteria included subjects not related to jewelry or piercings in the operating room. The last search in JBI was with search terms of "jewelry", "surgery", and "piercing". There were 248 results, with a limit of 5 years, down to 104 results. With exclusion criteria, there were two repeats noted, and one new result was usable. One JBI result was later removed, because it reviewed admission criteria, but did not include jewelry or body piercings specifically. This item is highlighted in red in the table.

The CINAHL Ultimate and CINAHL Plus with Full text search did not have a five-year limiter because there were no results with this limiter. The first search was for "jewelry" AND "operating room" AND "piercing" with 4 results that met all criteria. The second search in CINAHL was with the terms "jewelry" AND "anesthesia" AND "piercing" with 2 results, again older than five years used. The last search was with the terms "jewelry", "anesthesia", and "piercing" with 20 results, 4 were already found, there were 6 new results, and 3 interlibrary loans were requested and received for a total of 9 able to use; 4 were not available, and 3 did not meet inclusion criteria.

A search of Medline under "jewelry", "surgery", "piercing" provided 122 results, with two usable, one dated from 1941. A search of EBSCOhost E-book, Medline Complete, and ERIC databases was also performed with no results for jewelry AND anesthesia AND piercing. For the search jewelry AND anesthesia AND piercing there were 9 results, 1 repeat, and 8 usable. The results for jewelry AND surgery AND piercing had 38 results with 4 repeats and one new result obtained.

Three AORN Guidelines were identified as relating to the PICOT [11] [12] [26]. A search of available references, such as textbooks, included one from a book on Perianesthesia Nursing Core Curriculum: Preprocedure Phase I and Phase II PACU Nursing 4th Edition. One source was delivered by hand—an Anesthesia Patient Safety Foundation Newsletter from this year. Two additional references were obtained from references or cited by links. With all results combined, there were 37 results for the systematic review of the literature. Of these 32 were level 7—expert opinion or a single case study based on the LibGuides at Commonwealth Library Evidence Based Practice Pyramid—Doctor of Nursing Practice (**Figure 1**) [1]-[3] [5] [6] [8] [9] [13]-[16] [18]-[20] [22]-[25] [27]-[37]. There were two level 6 results that included a single qualitative study and an observational clinical study [7] [16]. There were 3 Level 1 results which are national guidelines based on evidence [11] [12] [26].

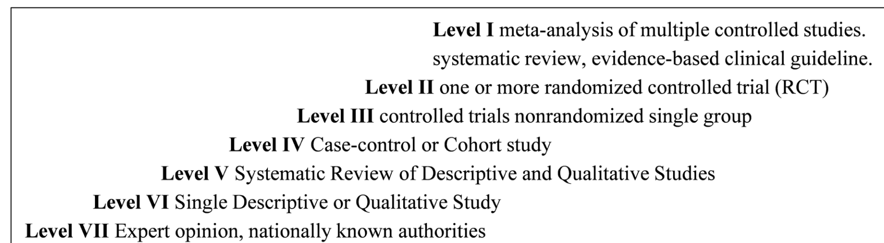

Figure 1. EBP Pyramid—Based on Pyramid descriptions from: Doctor of Nursing Practice—Commonwealth University, PA (https://www.commonwealth.edu/campus-life/mansfield).

These levels of evidence were not surprising, because it would be unethical to conduct randomized controlled trials that may lead to patient harm while wearing jewelry or body piercings during a procedure. It is significant that the importance of removing jewelry prior to caring for patients was identified as early as 1941 in the Military handbook. The key to the systematic review is the inclusion of all evidence, regardless of date, to show the significant number of findings that had the same recommendations, despite the findings of expert opinion or case studies. A significant number of these points highlight the importance of the issue and provide recommendations. Interestingly, the recommendation to remove jewelry is congruent with the 1941 Soldier's Handbook recommendation to remove jewelry.

Three unbiased perioperative nurses affiliated either with the operating room, perianesthesthesia care, or postoperative care reviewed all articles and identified themes. The members of this small group then met to discuss and aggregate findings. When there were differences in opinion, the evidence was reviewed by the entire group, and a consensus was obtained on all themes identified. See Themes Table for identified themes and frequency by article (**Table 1**).

2.2. Findings

The evidence from the systematic review of the literature was reviewed, and themes were identified by the three committee members. After completing all the reading and identification of themes, the team met and discussed the identified themes. Due to discrepancies in findings, the evidence hard copy was pulled out and reviewed by the entire team, and a team consensus was reached for the themes identified. Five major themes identified in the literature review include airway concerns, burns, removal of jewelry/piercings/metal, infection/bacteria, and providers and nurses to know how to remove jewelry/body piercings (**Table 1**).

Airway concern was identified in 22 of 36 evidence findings. Two of these 22 are level one evidence from AORN National Guidelines. 19 of the 22 were level 7 evidence based on expert opinion or a single case study. One was from an observational clinical study. Several authors identified a similar case scenario of lost piercings or pieces of piercings in the airways, gastrointestinal tract, or patient bed. Anesthesia providers consistently noted airway concerns with body piercings of the head/face. Interestingly, twelve authors recommend instructing patients to

remove jewelry/piercings prior to arrival for surgery; and seven authors, including one national guideline, recommend providing patient education preoperatively prior to the day of surgery.

Most items reviewed involved the removal of jewelry in some format. 32 authors identified that jewelry/metal should be removed prior to surgery/procedures. Of these, three were level 1 evidence, two were level 6 evidence, and 27 were expert opinion or case studies (level VII evidence). The recommendation was based on patient safety concerns related to airway, burns, injury, or infection.

Besides removal of jewelry, burns were discussed in 23 instances, with three of these identified in national guidelines as level one evidence. There was also one level six evidence; the remaining were all in expert opinion or case studies. Interestingly, seven authors recommended the use of alternative technology if patients are unable to remove jewelry to reduce the chance of burns. This includes the use of bipolar cautery, which is a newer technology. One of the seven authors who recommended alternative technology includes the AORN Guidelines.

There were several other less often discussed themes, including infection or the presence of bacteria from piercings/jewelry, identified by seventeen of thirty-two authors. Two of these were from AORN National Guidelines, and two were from level 6—studies. The rest of the evidence was expert opinion or case studies. Another theme identified by 19 sources was to know how to remove piercings/jewelry. 18 of these 19 recommendations were based on expert opinion/case study, and one was from a study. This may be an important aspect for facilities providing emergency procedures. Waivers for not removing jewelry were identified in ten sources. One of these is an AORN National Guideline, another is level 6 evidence, while the rest are expert opinions.

Besides waivers, a topic less discussed, but just as important, is the concept of empathy and cultural awareness of the significance of the piercing or jewelry to the patient. This was identified by 13 authors, with one level 6 evidence and the rest expert opinion. This recommendation points to the importance of possible nursing knowledge deficits of why some cultures/religions/beliefs may have piercings, or why piercings or jewelry are important to a specific patient. This requires nurses to become familiar with their patient population's cultural beliefs and perceptions.

There were three sources of evidence that were Level 1 on the evidence pyramid (**Figure 1**). These sources included the recommendation to remove jewelry and the concern for burns. Two of the three also included airway concerns and infection/bacteria concerns. There were two sources that were level six, both included infection/bacteria, and the need for removal of jewelry and body piercings in their recommendations. These are in line with the multiple Level 7 sources that overwhelmingly included removal of jewelry, infection/bacteria, burn, and airway concerns. Interestingly, knowing how to remove jewelry was included in 19 of the Level 7 evidence. Knowing how to remove jewelry was the only addition to the recommendations from the Level 1 Evidence that was found.

3. Recommendations

Based on the literature review, it is recommended that the patient be educated prior to surgery to remove all jewelry/piercings and be informed of the reasons for improving patient compliance. This education should begin prior to arrival for surgery and should also explain why jewelry/piercings are removed. Preoperative nurses need to ensure all jewelry/body piercings are removed, and if not, to notify both the anesthesia provider and surgeon. The recommendation to remove jewelry and to educate the patient prior to surgery is rated as a moderate strength of evidence based on national guideline recommendations and the numerous case studies presented (Strength of a Body of Evidence Scale, Brown, 2014) [38].

It is recommended that current cautery use in the OR be reviewed for the type of cautery available and that OR staff and providers be educated that it is safer to use bipolar cautery for individuals unable to remove metal. This is based on the moderate strength of evidence for burns related to national guideline recommendations and the number of case studies. It is a reasonable recommendation to educate staff and providers that bipolar cautery is safer to potentially reduce harm to patients.

Some authors recommended that patients sign a facility-approved waiver that the patient was aware of possible risks of leaving their jewelry/piercings in, in the event both the anesthesia provider and surgeon were amiable to proceed with the jewelry piercings still intact on the patient. This recommendation was adopted, and the waiver is currently under legal review.

It is also recommended in the literature that staff know how to remove jewelry/piercings (19 of 37). The knowledge of how to remove jewelry recommendations was usually specific to emergent surgeries and the need for the removal of jewelry/piercings. The small group did consider this recommendation; however, since our current practice does not include these types of cases, the recommendation will be for patients to remove jewelry/piercings prior to arrival for their procedure, and for staff to notify surgical and anesthesia providers if jewelry or a body piercing is unable to be removed.

4. Outcomes and Conclusions

4.1. Outcomes

The recommendations were presented to the Same Day Surgery Unit Practice Council and approved. The Jewelry and Body Piercing Standard Operating Procedure (SOP) and Jewelry Waiver were also later approved by the Professional Nurse Practice Committee. Key players identified for successful implementation include nursing surgery clinic staff, OR coordinator, surgical scheduler, PACU pre/post nursing staff, and the surgical/GI and anesthesia providers. Once the SOP is approved by administration, surgical services staff in the surgical, orthopedic, podiatry, gastrointestinal clinics, pre-procedure nurses, and surgical scheduler will be educated on the jewelry/body piercing requirements. Providers will be educated through the monthly surgical services meeting. It will be anticipated that all pa-

tients will remove jewelry/body piercings prior to arrival for their procedure and be aware that their jewelry may need to be cut off if unable to remove it, or the procedure may be canceled. The preoperative instructions for the center were revised to include the need to remove all jewelry and body piercings prior to arrival. The specific instructions also indicate that these may need to be cut off or surgery canceled if unable to be removed. Data collection is ongoing; however, antidotally, nurses have noticed increased compliance with patients removing jewelry and body piercings prior to arrival at the facility. Since these changes, there have been no surgery cases canceled due to issues with jewelry or body piercings or concerns.

Outcome measures for monitoring changes related to the SOP include burn rates, pressure injury rates, and compliance with the removal of jewelry prior to admission for procedure. Desired outcomes include no day of surgery surgical cancellations for jewelry/body piercings; burns from jewelry/body piercings when cautery is used in the OR; no pressure injuries from jewelry/body piercings; all piercings removed prior to transfer to surgery/procedure unless both surgeon and anesthesia providers agree to move forward with jewelry intact, and the jewelry waiver has been signed by patient. Outcome measures are reported at least quarterly and will be shared with the surgical services staff.

4.2. Limitations and Conclusion

The limitations of the systematic review were that only English sources were used and that a limited number of databases were used. Another limitation that cannot be remediated is that most of the literature on the topic is low-level evidence, such as expert opinion or case review/study. Jewelry and body piercings are a cause for concern in the patient undergoing a procedure. The concerns identified in the literature are most often linked to airway, burns, or infection concerns. The literature also provides suggestions to improve pre-procedure instructions to reduce the number of patients arriving with jewelry and body piercings on their person. Suggestions also include the need for awareness of cultural, religious, or personal beliefs that may be linked to jewelry or body piercings.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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