



Letter to Editor

Understanding and Mitigating Occupational Hazards: Protecting Our Maxillofacial Surgeons



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Citation: Shahraki M, Khazaei AH, Amirpour Haradasht S. Understanding and Mitigating Occupational Hazards: Protecting Our Maxillofacial Surgeons. Caspian Journal of Health Research. 2024; 9(2):61-66. <https://doi.org/10.32598/CJHR.9.2.763.4>

Running Title: Occupational Hazards in Maxillofacial Surgery

doi: <https://doi.org/10.32598/CJHR.9.2.763.4>

Maxillofacial surgeons are highly skilled professionals who specialize in treating injuries, diseases, and defects in the head, neck, face, jaws, and the hard and soft tissues of the oral and maxillofacial region. While their work is crucial in restoring function and aesthetics to patients, it also comes with a range of occupational hazards that can pose risks to their health and well-being [1].

Broadly, occupational hazards encountered by maxillofacial surgeons can be categorized into four main areas: Exposure to infectious diseases, musculoskeletal injuries, Exposure to radiation, Hazards of needle sticks. This article will comprehensively address these occupational risks.

Exposure to infectious diseases

One of the most significant hazards for maxillofacial surgeons is exposure to infectious diseases due to the

nature of their work. These healthcare professionals are responsible for treating conditions and injuries related to the head, neck, face, jaws, and oral cavity. This often involves performing surgical procedures that may expose them to blood, saliva, and other bodily fluids that can carry infectious pathogens [2].

One of the primary hazards that maxillofacial surgeons face is the potential for exposure to bloodborne pathogens such as HIV, hepatitis B, and hepatitis C. These viruses can be transmitted through contact with infected blood or bodily fluids, and surgical procedures involving the oral cavity and facial region present a particularly high risk of exposure. In addition to bloodborne pathogens, maxillofacial surgeons may also be at risk of exposure to airborne pathogens such as tuberculosis or respiratory viruses [3].

During the COVID-19 pandemic, oral and maxillofacial surgeons faced significant challenges due to the nature of their work, often involving close contact with

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patients and exposure to bodily fluids. This increased the risk of COVID-19 infection among these healthcare professionals. Despite the challenges, the adaptability and resilience of oral and maxillofacial surgeons have been vital in maintaining patient care while minimizing the risk of COVID-19 transmission within healthcare settings [4].

In addition to the risk of contracting infectious diseases themselves, maxillofacial surgeons also have a responsibility to prevent the transmission of these diseases to their patients. This requires strict adherence to infection control protocols, including proper hand hygiene, personal protective equipment (PPE) use, and sterilization of surgical instruments. Failure to follow these protocols can result in the transmission of infectious diseases from healthcare professionals to patients.

To mitigate the hazards of exposure to infectious diseases, maxillofacial surgeons must prioritize their own safety by following established infection control guidelines and staying up-to-date on best practices for preventing disease transmission. This includes receiving appropriate vaccinations against common infectious diseases and seeking prompt medical attention in the event of a potential exposure [5].

Furthermore, healthcare facilities should provide adequate training and resources for maxillofacial surgeons to ensure that they are able to safely perform their duties while minimizing the risk of exposure to infectious diseases. This may include access to high-quality PPE, regular training on infection control practices, and support from infection control specialists within the organization [6, 7].

Musculoskeletal injuries

Another occupational hazard for maxillofacial surgeons is musculoskeletal injuries. The nature of their work often requires them to maintain awkward postures for extended periods during surgical procedures. This can lead to chronic back pain, neck strain, and other musculoskeletal disorders. It is important for surgeons to practice proper ergonomics and take regular breaks during long procedures to reduce the risk of these injuries.

One common musculoskeletal injury among maxillofacial surgeons is neck and back pain. The constant bending over patients during surgeries can lead to strain on the spine and surrounding muscles. Over time, this can result in chronic pain and discomfort that may affect a surgeon's ability to perform surgeries effectively [8].

Shoulder injuries are also prevalent among maxillofacial surgeons due to the repetitive nature of their work. The constant use of surgical instruments and overhead arm movements can lead to conditions such as rotator cuff tears or shoulder impingement syndrome. Hand injuries are another hazard for maxillofacial surgeons. The intricate nature of maxillofacial surgeries requires precise hand movements that can lead to overuse injuries such as carpal tunnel syndrome or tendonitis.

In addition to these physical hazards, musculoskeletal injuries can also have a significant impact on a surgeon's mental well-being. Chronic pain and discomfort can lead to decreased job satisfaction and increased stress levels. This may ultimately affect a surgeon's ability to provide high-quality patient care [9].

To mitigate the hazards of musculoskeletal injuries for maxillofacial surgeons, it is essential for healthcare organizations to prioritize ergonomics in the workplace. This includes providing adjustable surgical equipment that allows for better posture during procedures, implementing regular breaks during surgeries to allow for stretching and rest periods, and offering ergonomic training programs for surgeons and operating room staff.

Furthermore, promoting a culture of self-care within the profession is crucial. Surgeons should be encouraged to prioritize their physical well-being by engaging in regular exercise routines that focus on strength training and flexibility. Additionally, seeking prompt medical attention for any signs of musculoskeletal discomfort is essential in preventing long-term injury [10, 11].

Exposure to radiation

Maxillofacial surgeons are at risk of exposure to radiation due to the nature of their work, which often involves the use of x-rays and other imaging techniques. While these tools are essential for diagnosing and treating patients, they also pose potential health hazards for the surgeons themselves. It is important for maxillofacial surgeons to be aware of these hazards and take appropriate measures to protect themselves from the harmful effects of radiation.

One of the primary hazards of exposure to radiation for maxillofacial surgeons is the increased risk of developing cancer. Studies have shown that long-term exposure to low levels of radiation can increase the risk of developing certain types of cancer, including leukemia, thyroid cancer, and breast cancer [12, 13].



Maxillofacial surgeons who regularly work with x-ray machines and other imaging equipment are at a higher risk of developing these types of cancer compared to the general population. In addition to an increased risk of cancer, exposure to radiation can also lead to other health problems such as cataracts, skin burns, and reproductive issues. Cataracts, in particular, are a common concern for maxillofacial surgeons who are exposed to radiation on a regular basis. The lens of the eye is particularly sensitive to radiation, and prolonged exposure can lead to clouding and loss of vision [14].

To protect themselves from these hazards, maxillofacial surgeons should take several precautions when working with radiation-emitting equipment. First and foremost, they should always use protective gear such as lead aprons, thyroid shields, and leaded glasses when operating x-ray machines or performing imaging procedures. These items help shield the body from harmful radiation and reduce the risk of long-term health effects.

Additionally, maxillofacial surgeons should limit their exposure to radiation whenever possible by using imaging techniques that minimize the amount of radiation used. This may include using digital x-ray technology or other advanced imaging methods that require lower levels of radiation. By being mindful of their exposure levels and taking steps to reduce them, maxillofacial surgeons can lower their overall risk of developing health problems related to radiation exposure [15].

It is also important for maxillofacial surgeons to undergo regular medical screenings and monitoring for potential signs of radiation-related health issues. This may include regular eye exams to check for cataracts, as well as routine blood tests and screenings for cancer. Early detection is key in managing any potential health problems related to radiation exposure [16].

Hazards of needle stick

Maxillofacial surgeons may face risks associated with surgical complications such as accidental injury from sharp instruments or exposure to hazardous chemicals used in sterilization processes. These injuries occur when a sharp object, such as a needle or scalpel, accidentally punctures the skin. While needle stick injuries may seem minor, they can have serious consequences for the health and safety of maxillofacial surgeons [17].

One of the primary hazards of needle stick injuries for maxillofacial surgeons is the risk of exposure to bloodborne pathogens. Bloodborne pathogens such as HIV,

hepatitis B, and hepatitis C can be transmitted through contaminated blood and bodily fluids. If a maxillofacial surgeon is accidentally stuck with a needle that has been in contact with infected blood, they are at risk of contracting these potentially life-threatening infections [18].

In addition to the risk of bloodborne pathogens, needle stick injuries can also lead to other complications for maxillofacial surgeons. For example, puncture wounds from needles or other sharp objects can cause soft tissue damage and nerve injury. This can result in pain, swelling, and loss of sensation in the affected area. In some cases, surgical intervention may be required to repair the damage caused by a needle stick injury.

Furthermore, needle stick injuries can have psychological effects on maxillofacial surgeons. The fear and anxiety associated with potential exposure to bloodborne pathogens can take a toll on their mental well-being. This can lead to increased stress and burnout among maxillofacial surgeons, impacting their overall job satisfaction and performance [19].

To mitigate the hazards of needle stick injuries for maxillofacial surgeons, it is essential to implement preventive measures and protocols in the workplace. This includes providing appropriate training on safe handling and disposal of sharps, as well as ensuring access to PPE such as gloves and safety glasses. Additionally, regular vaccination against bloodborne pathogens should be offered to all healthcare workers at risk of occupational exposure [20, 21].

Discussion

1) Maxillofacial surgeons face significant hazards related to exposure to infectious diseases in their line of work. It is essential for these healthcare professionals and their employers to prioritize safety by implementing robust infection control measures and providing ongoing support for maintaining a safe working environment. By doing so, we can help protect both maxillofacial surgeons and their patients from the potential risks associated with exposure to infectious diseases in clinical settings [2, 4].

2) While maxillofacial surgery is a rewarding profession that offers immense benefits to patients, it also presents significant hazards for surgeons in terms of musculoskeletal injuries. It is imperative for healthcare organizations to prioritize ergonomics in the workplace and promote a culture of self-care within the profession to mitigate these hazards effectively. By addressing these



concerns proactively, we can ensure that maxillofacial surgeons are able to continue providing high-quality care while maintaining their own physical well-being [22].

3) Maxillofacial surgeons face significant hazards from exposure to radiation in their line of work. It is crucial for them to be aware of these risks and take proactive measures to protect themselves from potential health problems associated with long-term exposure. By using protective gear, minimizing their exposure levels, and undergoing regular medical screenings, maxillofacial surgeons can reduce their overall risk and continue providing high-quality care for their patients while safeguarding their own well-being [12].

4) Needle stick injuries pose significant hazards for maxillofacial surgeons. The risk of exposure to blood-borne pathogens, soft tissue damage, nerve injury, and psychological distress are all potential consequences of these injuries. It is crucial for healthcare facilities to prioritize the safety and well-being of their staff by implementing effective preventive measures and protocols to minimize the risks associated with needle stick injuries. By doing so, we can ensure that maxillofacial surgeons are able to perform their duties safely and effectively without compromising their health and safety [23].

5) To mitigate these occupational hazards, it is essential for maxillofacial surgeons to undergo comprehensive training on infection control practices, radiation safety measures, and proper ergonomics. Regular safety training sessions should be conducted within healthcare facilities where they practice [1].

Conclusion

In conclusion, while maxillofacial surgery is a rewarding profession that allows surgeons to make a significant impact on their patients' lives, it also comes with inherent occupational hazards that must be carefully managed. By implementing strict safety measures and providing ongoing education on occupational health risks, healthcare facilities can help ensure the well-being of their maxillofacial surgeons while they continue providing essential care to their patients.

References

- [1] Yu GY. Oral and maxillofacial surgery: Current and future. *Ann Maxillofac Surg.* 2013; 3(2):111-2. [\[DOI:10.4103/2231-0746.119209\]](https://doi.org/10.4103/2231-0746.119209) [\[PMID\]](https://pubmed.ncbi.nlm.nih.gov/23707072/) [\[PMCID\]](https://pubmed.ncbi.nlm.nih.gov/23707072/)
- [2] Gooch BF, Siew C, Cleveland JL, Gruninger SE, Lockwood SA, Joy ED. Occupational blood exposure and HIV infection among oral and maxillofacial surgeons. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* 1998; 85(2):128-34. [\[DOI:10.1016/S1079-2104\(98\)90414-0\]](https://doi.org/10.1016/S1079-2104(98)90414-0) [\[PMID\]](https://pubmed.ncbi.nlm.nih.gov/9600000/)
- [3] Shaghaghian S, Golkari A, Pardis S, Rezayi A. Occupational exposure of Shiraz dental students to patients' blood and body fluid. *J Dent.* 2015; 16(3):206-13. [\[PMID\]](https://pubmed.ncbi.nlm.nih.gov/26040000/) [\[PMCID\]](https://pubmed.ncbi.nlm.nih.gov/26040000/)
- [4] Chigurupati R, Panchal N, Henry AM, Batal H, Sethi A, D'innocenzo R, et al. Considerations for oral and maxillofacial surgeons in COVID-19 Era: Can we sustain the solutions to keep our patients and healthcare personnel safe? *J Oral Maxillofac Surg.* 2020; 78(8):1241-56. [\[DOI:10.1016/j.joms.2020.05.027\]](https://doi.org/10.1016/j.joms.2020.05.027) [\[PMID\]](https://pubmed.ncbi.nlm.nih.gov/32500000/) [\[PMCID\]](https://pubmed.ncbi.nlm.nih.gov/32500000/)
- [5] Rider CA. Infection control within the oral surgeon's office. *Compend Contin Educ Dent.* 2004; 25(7):529-33. [\[PMID\]](https://pubmed.ncbi.nlm.nih.gov/15247700/)
- [6] Hoshi K, Ikebe T, Ota Y, Kishimoto H, Kurata T, & Kurita H, et al. Guide for surgical procedures in oral and maxillofacial areas during coronavirus disease 2019 pandemic. *J Oral Maxillofac Surg Med Pathol.* 2022; 34(3):294-314. [\[DOI:10.1016/j.joms.2021.10.007\]](https://doi.org/10.1016/j.joms.2021.10.007) [\[PMID\]](https://pubmed.ncbi.nlm.nih.gov/34600000/) [\[PMCID\]](https://pubmed.ncbi.nlm.nih.gov/34600000/)
- [7] Budnyak MA, Gurevich KG, Fabrikant KG, Miller K, Puttaiyah R. Dental infection control and occupational safety in the Russian Federation. *J Contemp Dent Pract.* 2012; 13(5):703-12. [\[DOI:10.5005/jp-journals-10024-1213\]](https://doi.org/10.5005/jp-journals-10024-1213) [\[PMID\]](https://pubmed.ncbi.nlm.nih.gov/23000000/)
- [8] Krishnan G, Manodh P, Prasad T, Raj A, Kumar P. Prevalence of musculoskeletal pain among oral and maxillofacial surgeons. *Med Leg Update.* 2020; 20(4):2206-14. [\[DOI:10.37506/mlu.v20i4.2173\]](https://doi.org/10.37506/mlu.v20i4.2173)
- [9] Taylor CA, Strauss RA, Best AM. Postural preference and musculoskeletal complaints in oral and maxillofacial surgeons. *J Oral Maxillofac Surg.* 2018; 76(1):46-51. [\[DOI:10.1016/j.joms.2017.04.020\]](https://doi.org/10.1016/j.joms.2017.04.020) [\[PMID\]](https://pubmed.ncbi.nlm.nih.gov/28540000/)
- [10] Chavez JA, Nam YS, Schwartz A, DeMoulin D, Swift JQ, Turner C. Preventing work-related musculoskeletal injuries among oral and maxillofacial surgeons. *Work.* 2023; 76(1):243-9. [\[DOI:10.3233/WOR-220059\]](https://doi.org/10.3233/WOR-220059) [\[PMID\]](https://pubmed.ncbi.nlm.nih.gov/36700000/)
- [11] Agarwal V. Musculoskeletal disorders in oral and maxillofacial surgeons: A resident's perspective. *J Oral Maxillofac Surg.* 2019; 77(7):1330-1. [\[DOI:10.1016/j.joms.2019.01.057\]](https://doi.org/10.1016/j.joms.2019.01.057) [\[PMID\]](https://pubmed.ncbi.nlm.nih.gov/30900000/)
- [12] Jenkins NW, Parrish JM, Sheha ED, Singh K. Intraoperative risks of radiation exposure for the surgeon and patient. *Ann Transl Med.* 2021; 9(1):84. [\[DOI:10.21037/atm-20-1052\]](https://doi.org/10.21037/atm-20-1052) [\[PMID\]](https://pubmed.ncbi.nlm.nih.gov/33800000/) [\[PMCID\]](https://pubmed.ncbi.nlm.nih.gov/33800000/)
- [13] Dewey P, Incoll I. Evaluation of thyroid shields for reduction of radiation exposure to orthopaedic surgeons. *Aust N Z J Surg.* 1998; 68(9):635-6. [\[DOI:10.1111/j.1445-2197.1998.tb04832.x\]](https://doi.org/10.1111/j.1445-2197.1998.tb04832.x) [\[PMID\]](https://pubmed.ncbi.nlm.nih.gov/9750000/)
- [14] Hayda RA, Hsu RY, DePasse JM, Gil JA. Radiation exposure and health risks for orthopaedic surgeons. *J Am Acad Orthop Surg.* 2018; 26(8):268-77. [\[DOI:10.5435/JAAOS-D-16-00342\]](https://doi.org/10.5435/JAAOS-D-16-00342) [\[PMID\]](https://pubmed.ncbi.nlm.nih.gov/29800000/)



- [15] Bahreyni Toossi MT, Akbari F, Bayani Roodi S. Radiation exposure to critical organs in panoramic dental examination. *Acta Med Iran.* 1970; 50(12):809-13. [\[Link\]](#)
- [16] Ver Berne J, Politis C, Shaheen E, Jacobs R. Cumulative exposure and lifetime cancer risk from diagnostic radiation in patients undergoing orthognathic surgery: A cross-sectional analysis. *Int J Oral Maxillofac Surg.* 2023; 52(10):1064-70. [\[DOI:10.1016/j.ijom.2023.02.001\]](#) [\[PMID\]](#)
- [17] Bali R, Sharma P, Garg A. Incidence and patterns of needle-stick injuries during intermaxillary fixation. *Br J Oral Maxillofac Surg.* 2011; 49(3):221-4. [\[DOI:10.1016/j.bjoms.2010.04.010\]](#) [\[PMID\]](#)
- [18] Gaballah K, Warbuton D, Sihmby K, Renton T. Needle stick injuries among dental students: Risk factors and recommendations for prevention. *Libyan J Med.* 2012;7. [\[DOI:10.3402/ljm.v7i0.17507\]](#) [\[PMID\]](#) [\[PMCID\]](#)
- [19] Pervaiz M, Gilbert R, Ali N. The prevalence and under-reporting of needlestick injuries among dental healthcare workers in Pakistan: A systematic review. *Int J Dent.* 2018; 2018:9609038. [\[DOI:10.1155/2018/9609038\]](#) [\[PMID\]](#) [\[PMCID\]](#)
- [20] David HT, Aminzadeh KK, Kae AH, Radomsky SC. Instrument retraction to avoid needle-stick injuries during intraoral local anesthesia. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* 2007; 103(3):e11-3. [\[DOI:10.1016/j.tripleo.2006.10.020\]](#) [\[PMID\]](#)
- [21] Bijani B, Azimian J, Soleimany M, Mohammadi N. [Epidemiology and risk factors of needle stick injuries (Persian)]. *Adv Nurse Midwifery.* 2013; 22(78):1-9. [\[Link\]](#)
- [22] Howarth AL, Hallbeck MS, Lemaine V, Singh DJ, Noland SS. Work-Related musculoskeletal discomfort and injury in craniofacial and maxillofacial surgeons. *J Craniofac Surg.* 2019; 30(7):1982-5. [\[PMID\]](#)
- [23] Chhabra N, Jain S, Chhabra S. Prevention of needle stick injuries during irrigation in oral & maxillofacial surgery by a simple technical Modification Chhabra. *Int J Infect Control.* 2011; 7(4):1-3. [\[DOI:10.3396/ijic.V7i4.038.11\]](#)

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