

GEORGIAN MEDICAL NEWS

ISSN 1512-0112

NO 11 (344) ноябрь 2023

ТБИЛИСИ - NEW YORK



ЕЖЕМЕСЯЧНЫЙ НАУЧНЫЙ ЖУРНАЛ

Медицинские новости Грузии
საქართველოს სამედიცინო სიახლენი

GEORGIAN MEDICAL NEWS

Monthly Georgia-US joint scientific journal published both in electronic and paper formats of the Agency of Medical Information of the Georgian Association of Business Press.
Published since 1994. Distributed in NIS, EU and USA.

GMN: Georgian Medical News is peer-reviewed, published monthly journal committed to promoting the science and art of medicine and the betterment of public health, published by the GMN Editorial Board since 1994. GMN carries original scientific articles on medicine, biology and pharmacy, which are of experimental, theoretical and practical character; publishes original research, reviews, commentaries, editorials, essays, medical news, and correspondence in English and Russian.

GMN is indexed in MEDLINE, SCOPUS, PubMed and VINITI Russian Academy of Sciences. The full text content is available through EBSCO databases.

GMN: Медицинские новости Грузии - ежемесячный рецензируемый научный журнал, издаётся Редакционной коллегией с 1994 года на русском и английском языках в целях поддержки медицинской науки и улучшения здравоохранения. В журнале публикуются оригинальные научные статьи в области медицины, биологии и фармации, статьи обзорного характера, научные сообщения, новости медицины и здравоохранения. Журнал индексируется в MEDLINE, отражён в базе данных SCOPUS, PubMed и ВИНТИ РАН. Полнотекстовые статьи журнала доступны через БД EBSCO.

GMN: Georgian Medical News – საქართველოს სამედიცინო სიახლენი – არის ყოველთვიური სამეცნიერო სამედიცინო რეცენზირებადი ჟურნალი, გამოიცემა 1994 წლიდან, წარმოადგენს სარედაქციო კოლეგიისა და აშშ-ის მეცნიერების, განათლების, ინდუსტრიის, ხელოვნებისა და ბუნებისმეტყველების საერთაშორისო აკადემიის ერთობლივ გამოცემას. GMN-ში რუსულ და ინგლისურ ენებზე ქვეყნდება ექსპერიმენტული, თეორიული და პრაქტიკული ხასიათის ორიგინალური სამეცნიერო სტატიები მედიცინის, ბიოლოგიისა და ფარმაციის სფეროში, მიმოხილვითი ხასიათის სტატიები.

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WEBSITE

www.geomednews.com

К СВЕДЕНИЮ АВТОРОВ!

При направлении статьи в редакцию необходимо соблюдать следующие правила:

1. Статья должна быть представлена в двух экземплярах, на русском или английском языках, напечатанная через **полтора интервала на одной стороне стандартного листа с шириной левого поля в три сантиметра**. Используемый компьютерный шрифт для текста на русском и английском языках - **Times New Roman (Кириллица)**, для текста на грузинском языке следует использовать **AcadNusx**. Размер шрифта - **12**. К рукописи, напечатанной на компьютере, должен быть приложен CD со статьей.

2. Размер статьи должен быть не менее десяти и не более двадцати страниц машинописи, включая указатель литературы и резюме на английском, русском и грузинском языках.

3. В статье должны быть освещены актуальность данного материала, методы и результаты исследования и их обсуждение.

При представлении в печать научных экспериментальных работ авторы должны указывать вид и количество экспериментальных животных, применявшиеся методы обезболивания и усыпления (в ходе острых опытов).

4. К статье должны быть приложены краткое (на полстраницы) резюме на английском, русском и грузинском языках (включающее следующие разделы: цель исследования, материал и методы, результаты и заключение) и список ключевых слов (key words).

5. Таблицы необходимо представлять в печатной форме. Фотокопии не принимаются. **Все цифровые, итоговые и процентные данные в таблицах должны соответствовать таковым в тексте статьи**. Таблицы и графики должны быть озаглавлены.

6. Фотографии должны быть контрастными, фотокопии с рентгенограмм - в позитивном изображении. Рисунки, чертежи и диаграммы следует озаглавить, пронумеровать и вставить в соответствующее место текста **в tiff формате**.

В подписях к микрофотографиям следует указывать степень увеличения через окуляр или объектив и метод окраски или импрегнации срезов.

7. Фамилии отечественных авторов приводятся в оригинальной транскрипции.

8. При оформлении и направлении статей в журнал МНГ просим авторов соблюдать правила, изложенные в «Единых требованиях к рукописям, представляемым в биомедицинские журналы», принятых Международным комитетом редакторов медицинских журналов - <http://www.spinesurgery.ru/files/publish.pdf> и http://www.nlm.nih.gov/bsd/uniform_requirements.html В конце каждой оригинальной статьи приводится библиографический список. В список литературы включаются все материалы, на которые имеются ссылки в тексте. Список составляется в алфавитном порядке и нумеруется. Литературный источник приводится на языке оригинала. В списке литературы сначала приводятся работы, написанные знаками грузинского алфавита, затем кириллицей и латиницей. Ссылки на цитируемые работы в тексте статьи даются в квадратных скобках в виде номера, соответствующего номеру данной работы в списке литературы. Большинство цитированных источников должны быть за последние 5-7 лет.

9. Для получения права на публикацию статья должна иметь от руководителя работы или учреждения визу и сопроводительное отношение, написанные или напечатанные на бланке и заверенные подписью и печатью.

10. В конце статьи должны быть подписи всех авторов, полностью приведены их фамилии, имена и отчества, указаны служебный и домашний номера телефонов и адреса или иные координаты. Количество авторов (соавторов) не должно превышать пяти человек.

11. Редакция оставляет за собой право сокращать и исправлять статьи. Корректур авторам не высылаются, вся работа и сверка проводится по авторскому оригиналу.

12. Недопустимо направление в редакцию работ, представленных к печати в иных издательствах или опубликованных в других изданиях.

При нарушении указанных правил статьи не рассматриваются.

REQUIREMENTS

Please note, materials submitted to the Editorial Office Staff are supposed to meet the following requirements:

1. Articles must be provided with a double copy, in English or Russian languages and typed or computer-printed on a single side of standard typing paper, with the left margin of 3 centimeters width, and 1.5 spacing between the lines, typeface - **Times New Roman (Cyrillic)**, print size - 12 (referring to Georgian and Russian materials). With computer-printed texts please enclose a CD carrying the same file titled with Latin symbols.

2. Size of the article, including index and resume in English, Russian and Georgian languages must be at least 10 pages and not exceed the limit of 20 pages of typed or computer-printed text.

3. Submitted material must include a coverage of a topical subject, research methods, results, and review.

Authors of the scientific-research works must indicate the number of experimental biological species drawn in, list the employed methods of anesthetization and soporific means used during acute tests.

4. Articles must have a short (half page) abstract in English, Russian and Georgian (including the following sections: aim of study, material and methods, results and conclusions) and a list of key words.

5. Tables must be presented in an original typed or computer-printed form, instead of a photocopied version. **Numbers, totals, percentile data on the tables must coincide with those in the texts of the articles.** Tables and graphs must be headed.

6. Photographs are required to be contrasted and must be submitted with doubles. Please number each photograph with a pencil on its back, indicate author's name, title of the article (short version), and mark out its top and bottom parts. Drawings must be accurate, drafts and diagrams drawn in Indian ink (or black ink). Photocopies of the X-ray photographs must be presented in a positive image in **tiff format**.

Accurately numbered subtitles for each illustration must be listed on a separate sheet of paper. In the subtitles for the microphotographs please indicate the ocular and objective lens magnification power, method of coloring or impregnation of the microscopic sections (preparations).

7. Please indicate last names, first and middle initials of the native authors, present names and initials of the foreign authors in the transcription of the original language, enclose in parenthesis corresponding number under which the author is listed in the reference materials.

8. Please follow guidance offered to authors by The International Committee of Medical Journal Editors guidance in its Uniform Requirements for Manuscripts Submitted to Biomedical Journals publication available online at: http://www.nlm.nih.gov/bsd/uniform_requirements.html
http://www.icmje.org/urm_full.pdf

In GMN style for each work cited in the text, a bibliographic reference is given, and this is located at the end of the article under the title "References". All references cited in the text must be listed. The list of references should be arranged alphabetically and then numbered. References are numbered in the text [numbers in square brackets] and in the reference list and numbers are repeated throughout the text as needed. The bibliographic description is given in the language of publication (citations in Georgian script are followed by Cyrillic and Latin).

9. To obtain the rights of publication articles must be accompanied by a visa from the project instructor or the establishment, where the work has been performed, and a reference letter, both written or typed on a special signed form, certified by a stamp or a seal.

10. Articles must be signed by all of the authors at the end, and they must be provided with a list of full names, office and home phone numbers and addresses or other non-office locations where the authors could be reached. The number of the authors (co-authors) must not exceed the limit of 5 people.

11. Editorial Staff reserves the rights to cut down in size and correct the articles. Proof-sheets are not sent out to the authors. The entire editorial and collation work is performed according to the author's original text.

12. Sending in the works that have already been assigned to the press by other Editorial Staffs or have been printed by other publishers is not permissible.

**Articles that Fail to Meet the Aforementioned
Requirements are not Assigned to be Reviewed.**

ავტორთა საქურაღებოლ!

რედაქციაში სტატიის წარმოდგენისას საჭიროა დაიცვათ შემდეგი წესები:

1. სტატია უნდა წარმოადგინოთ 2 ცალად, რუსულ ან ინგლისურ ენებზე დაბეჭდილი სტანდარტული ფურცლის 1 გვერდზე, 3 სმ სიგანის მარცხენა ველისა და სტრიქონებს შორის 1,5 ინტერვალის დაცვით. გამოყენებული კომპიუტერული შრიფტი რუსულ და ინგლისურენოვან ტექსტებში - **Times New Roman (Кириллица)**, ხოლო ქართულენოვან ტექსტში საჭიროა გამოვიყენოთ **AcadNusx**. შრიფტის ზომა – 12. სტატიას თან უნდა ახლდეს CD სტატიით.

2. სტატიის მოცულობა არ უნდა შეადგენდეს 10 გვერდზე ნაკლებს და 20 გვერდზე მეტს ლიტერატურის სიის და რეზიუმეების (ინგლისურ, რუსულ და ქართულ ენებზე) ჩათვლით.

3. სტატიაში საჭიროა გაშუქდეს: საკითხის აქტუალობა; კვლევის მიზანი; საკვლევი მასალა და გამოყენებული მეთოდები; მიღებული შედეგები და მათი განსჯა. ექსპერიმენტული ხასიათის სტატიების წარმოდგენისას ავტორებმა უნდა მიუთითონ საექსპერიმენტო ცხოველების სახეობა და რაოდენობა; გაუტკივარებისა და დაძინების მეთოდები (მწვავე ცდების პირობებში).

4. სტატიას თან უნდა ახლდეს რეზიუმე ინგლისურ, რუსულ და ქართულ ენებზე არანაკლებ ნახევარი გვერდის მოცულობისა (სათაურის, ავტორების, დაწესებულების მითითებით და უნდა შეიცავდეს შემდეგ განყოფილებებს: მიზანი, მასალა და მეთოდები, შედეგები და დასკვნები; ტექსტუალური ნაწილი არ უნდა იყოს 15 სტრიქონზე ნაკლები) და საკვანძო სიტყვების ჩამონათვალი (key words).

5. ცხრილები საჭიროა წარმოადგინოთ ნაბეჭდი სახით. ყველა ციფრული, შემაჯამებელი და პროცენტული მონაცემები უნდა შეესაბამებოდეს ტექსტში მოყვანილს.

6. ფოტოსურათები უნდა იყოს კონტრასტული; სურათები, ნახაზები, დიაგრამები - დასათაურებული, დანომრილი და სათანადო ადგილას ჩასმული. რენტგენოგრამების ფოტოასლები წარმოადგინეთ პოზიტიური გამოსახულებით **tiff** ფორმატში. მიკროფოტოსურათების წარწერებში საჭიროა მიუთითოთ ოკულარის ან ობიექტივის საშუალებით გადიდების ხარისხი, ანათალების შედეგის ან იმპრეგნაციის მეთოდი და აღნიშნოთ სურათის ზედა და ქვედა ნაწილები.

7. სამამულო ავტორების გვარები სტატიაში აღინიშნება ინიციალების თანდართვით, უცხოურისა – უცხოური ტრანსკრიპციით.

8. სტატიას თან უნდა ახლდეს ავტორის მიერ გამოყენებული სამამულო და უცხოური შრომების ბიბლიოგრაფიული სია (ბოლო 5-8 წლის სიღრმით). ანბანური წყობით წარმოდგენილ ბიბლიოგრაფიულ სიაში მიუთითეთ ჯერ სამამულო, შემდეგ უცხოელი ავტორები (გვარი, ინიციალები, სტატიის სათაური, ჟურნალის დასახელება, გამოცემის ადგილი, წელი, ჟურნალის №, პირველი და ბოლო გვერდები). მონოგრაფიის შემთხვევაში მიუთითეთ გამოცემის წელი, ადგილი და გვერდების საერთო რაოდენობა. ტექსტში კვადრატულ ფხიხლებში უნდა მიუთითოთ ავტორის შესაბამისი N ლიტერატურის სიის მიხედვით. მიზანშეწონილია, რომ ციტირებული წყაროების უმეტესი ნაწილი იყოს 5-6 წლის სიღრმის.

9. სტატიას თან უნდა ახლდეს: ა) დაწესებულების ან სამეცნიერო ხელმძღვანელის წარდგინება, დამოწმებული ხელმოწერითა და ბეჭდით; ბ) დარგის სპეციალისტის დამოწმებული რეცენზია, რომელშიც მითითებული იქნება საკითხის აქტუალობა, მასალის საკმაობა, მეთოდის სანდოობა, შედეგების სამეცნიერო-პრაქტიკული მნიშვნელობა.

10. სტატიის ბოლოს საჭიროა ყველა ავტორის ხელმოწერა, რომელთა რაოდენობა არ უნდა აღემატებოდეს 5-ს.

11. რედაქცია იტოვებს უფლებას შეასწოროს სტატია. ტექსტზე მუშაობა და შეჯერება ხდება საავტორო ორიგინალის მიხედვით.

12. დაუშვებელია რედაქციაში ისეთი სტატიის წარდგენა, რომელიც დასაბეჭდად წარდგენილი იყო სხვა რედაქციაში ან გამოქვეყნებული იყო სხვა გამოცემებში.

აღნიშნული წესების დარღვევის შემთხვევაში სტატიები არ განიხილება.

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OCCUPATIONAL HAZARDS IN ORTHOPAEDIC PROCEDURES-A NARRATIVE REVIEW OF CURRENT LITERATURE

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Abstract.

Orthopaedic surgeries pose various risks to the health of orthopaedic surgeons: radiation, noise, infection, chemical exposure, and musculoskeletal injury. These are associated with short and long-term health problems including malignancy and teratogenicity. Orthopaedic surgeons' health is critical to ensure optimal patient care. Most of these hazards can be obviated or minimized by adopting rigorous prevention protocols and raising awareness. Further related research is warranted and guidelines regarding prevention need to be framed by regulatory bodies.

Key words. Occupational hazard, radiation, chemicals, noise, musculoskeletal injury, surgical smoke.

Introduction.

Over recent years there has been an increase in orthopaedic theatre procedures and in addition to it the risk of occupational hazard for orthopaedic surgeons has been on the rise. Occupational hazards specific to orthopaedic procedures involve exposure to radiation, surgical smoke, chemicals, hazardous noise and musculoskeletal injuries [1]. Although most surgeons acknowledge the risk, there is a lack of in-depth knowledge regarding the long-term harm associated with these hazards and ways to diminish them. The focus should be on increasing awareness, following guidelines, and encouraging preventive measures to establish a safe working atmosphere.

Review.

Radiation hazard:

Increased use of fluoroscopy is associated with increased radiation exposure for orthopaedic surgeons and theatre personnel: increasing the risk of malignancies, ophthalmic and thyroid disorders. Trauma and spinal surgeries pose the highest radiation risk. Increasingly popular percutaneous and minimally invasive methods are associated with increased radiation exposure compared to their counterparts [2]. The International Commission on Radiation Exposure set occupational limits of 20 mSv/year or 100 mSv in 5 years. As per BOA (British Orthopaedic Association), 1-year exposure should not exceed 50 mSv. Within these limits, the resultant malignancy risk is under 1 in 1000 over a working life of 47 years. Separate limits exist for body tissues such as the thyroid and eyes [3]. According to BOA, the dose exposure of the majority of orthopaedic surgeons is under 2mSv/year - less than other specialities such as vascular surgery, interventional cardiology, and interventional radiology [3-5].

Whilst the carcinogenic effects of high and moderate levels of radiation is widely recognised, the effect of chronic low-grade exposure remains obscure. A study of nuclear workers

demonstrated an increase in death from solid cancers such as lymphoma and leukaemia with increased exposure to radiation in the workplace [3,6]. There is a scarcity of longitudinal studies that have interrogated the results of radiation exposure for orthopaedic surgeons. However, evidence from other healthcare workers shows an increased risk of head and neck tumours and cataracts with exposure to ionizing radiation [3,7-9]. Self-reported surveys from female orthopaedic surgeons show an increase in breast cancer prevalence [3,10-12].

In the operating theatre, the primary surgeon has the highest radiation exposure apart from the patient [13]. Junior surgeons tend to use fluoroscopy more frequently, increasing their radiation exposure compared to experienced senior surgeons [14-16].

BOA suggested the following guidelines to reduce individual exposure: limit time of exposure, and prioritise distance and shielding, correctly position the C-arm, remain vigilant of scatter radiation from patients and walls, avoid the beam during screening and avoid using the image intensifier in the true lateral position. If lateral view is required, consider a 70-degree view to direct the radiation away from the surgeon. Live screening should be avoided whenever possible. Personal Protective Equipment (PPE) should be used all times and there should be effort on reducing the total number of images. Surgeons should avoid exposure to the axilla and lateral chest wall by remaining perpendicular to the beam, setting up screens in the appropriate position to avoid twisting, positioning the axilla further from the beam and avoiding lateral views and keeping arms down during screening. Orthopaedic surgeons and radiographers are responsible for keeping exposure to ionising radiation "as low as reasonably achievable". Formal education and training for orthopaedic theatre staff is key in achieving this goal [3].

Surgical smoke:

Surgical smoke generated by diathermy during orthopaedic procedures poses a risk to both the patient and operating surgeon. According to the ICSP (International Council on Surgical Smoke Plume) report, surgical smoke contains mutagenic and carcinogenic particles, bacteria, and viruses such as HPV, HIV and SARS CoV-2. The other hazards include: aerosolised haemoglobin, blood-borne pathogens, carbon, tissue fragments, live cells, carbon monoxide, toluene, benzene-known carcinogens, hydrogen cyanide, perchloroethylene and formaldehyde [17].

The smoke from one gram of tissue destroyed by electrocautery has the mutagenic potential of smoking six unfiltered cigarettes [18] and the average plume created in one day in the operating room was found to be equivalent to smoking as many as 30 unfiltered cigarettes per day [19].

Theatre personnel exposed to surgical smoke experienced headaches, cough, eye irritation and shortness of breath, yet the ICSP reports that 52% of peri-operative personnel have never received education on the hazards of surgical smoke exposure. The ICSP report stipulates that masks are not sufficient for protection against surgical smoke plumes and advises an approved plume evacuation system. Plume evacuation systems with Ultra Low Penetration Air Filter (ULPA) filters of 0.1 microns are the gold standard and have 99.9995% efficiency.

High-Efficiency Particulate Air (HEPA) Filters are not considered as they only filter particulates down to 0.3 microns and are 99.97% efficient [17]. The ICSP report found paucity of risk assessments, lack of specific perioperative education and training, and inadequate preventative measures hinder the use of surgical smoke plume evacuation devices [17].

Exposure to chemicals:

Bone cement is one of the chemicals commonly used in orthopaedic surgeries. The core ingredient of bone cement is methyl-methacrylate (MMA). MMA has shown risks of hypotension, thromboembolic occurrences, and cardiac shock on patients, and also health hazards on operating surgeons and theatre personnel. MMA has deleterious effects on dermatological, pulmonary (such as asthma, laryngitis, pneumonitis) and neurological systems (such as peripheral neuropathy) [20]. Direct contact may cause skin sensitization [20-22]. Furthermore, MMA is toxic to human neurons in vitro [23], and MMA exposure in single total arthroplasty during mixing causes fetotoxicity in animal models, leading to concerns that MMA is fetotoxic. Reassuringly, another study did not find any difference in levels of MMA in serum and breast milk in female orthopaedic surgeons exposed to MMA and in controls [24]. WHO recommends programmes to increase awareness of hazards associated with MMA by providing staff with appropriate training. Individuals should avoid direct skin contact with MMA and wear appropriate PPE. MMA should only be used in a well-ventilated area with recirculating air filters with gas absorbents of acid carbon [25,26].

Exposure to infection:

Orthopaedic surgeons are at a high risk of exposure to infectious organisms through percutaneous, airborne, and mucocutaneous contact through use of sharp objects such as saws, drills, suture needles and sharp bone fragments which increases the risk of percutaneous injury. Mucocutaneous exposure to pathogens is associated with splattering from power tools and pulsatile irrigation [26]. In a review of 1828 patients, 74% of exposures were preventable by using recommended PPE. Risk factors for exposure include orthopaedic trauma surgeries lasting over 3 hours, and those with a blood loss greater than 300 mL [27]. The most commonly encountered and harmful pathogens in orthopaedic practice include HIV, Hepatitis B (HBV), and Hepatitis C [26]. The risk of infection via percutaneous exposure for HIV is 0.3%, for HBV 6-30% and for HCV 1.8%. The risk of infection via mucocutaneous exposure is 0.09% for HIV, non-quantifiable for HBV and extremely rare for HCV [26].

The best way to prevent exposure to infection is by following Hospital infection control policies. Double layering gloves significantly decrease contamination risk, and changing of outer

gloves at frequent intervals prevents further risk. Face masks and eyewear are particularly important in reducing mucocutaneous and eye exposure due to the spray of blood and bone fragments from power tools. Water and oil-repellent surgical gowns with smaller pore sizes provide the greatest protection.

Exposure to Hazardous Noise:

Orthopaedic surgeons are regularly exposed to hazardous noise and are therefore at increased risk of experiencing noise-induced hearing loss (NIHL). Regular exposure above 110 dB at a one-minute duration risks permanent hearing loss (The National Institute on Deafness and Other Communicable Disorders). During total knee or total hip arthroplasty, noise levels reach 105.6 dB with the use of a mallet and 97.9 dB while using an oscillating saw [26-29]. High-speed gas turbine drills create noise up to 118 dB. Suction tips with tissue trapped inside can create a whistling noise of up to 96 dB [30].

Occupational Safety and Health Administration (OSHA) set a threshold for hazardous noise to a time-weighted average of 85 dB in an eight-hour work shift. If that threshold is exceeded, the allowable duration of exposure must be halved for every 5 dB increase over 85 dB [26]. The noise level in an orthopaedic operating room consistently exceeds the OSHA's threshold level. Members of the orthopaedic operating team should attend regular hearing conservation programmes, undergo regular audiometric testing, and wear hearing protection. Additionally, all orthopaedic personnel are advised to distance themselves from noise sources. Finally, surgeons are encouraged to use power tools that produce lower noise levels [31].

Risk of musculoskeletal injury:

Orthopaedic surgeons are at risk of musculoskeletal injury due to force required for musculoskeletal manipulation, prolonged standing in operating room and lack of ergonomic insight. Most of the back and neck pain, resulting in lumbar and cervical spondylosis, is due to prolonged static head-bent and back-bent postures [26]. The average adult reconstruction orthopaedic surgeon swings a 3- to 5-lb mallet approximately 300 times a day, leading to high rates of lateral epicondylitis and rotator cuff pathology. Nearly two-thirds of orthopaedic surgeons experience a work-related injury during their career, and 31% require surgery themselves to treat the injury [32].

In one study by Davis et al, 25% sustained an injury to the hand; 19%, to the lower back; 10%, to the neck; 7%, to the shoulder. Common hand injuries include carpal tunnel syndrome and carpometacarpal thumb arthritis, which are related to the constant forceful grip and pinch of nonergonomic instruments. Approximately 39% of orthopaedists required medical care as a result of their injury, but only 25% of injured surgeons reported the injury to their institution. Ten percent of surgeons reported missing work as a result of a workplace injury: and 4% missed at least three weeks [33].

If the comparison is made between surgeons performing open surgery versus surgeons performing minimally invasive procedures, the latter group are considerably more likely to experience pain in the neck, arm or shoulder, hands, and legs [34].

The keyway to prevent musculoskeletal injury is to maintain a correct posture during surgical procedures and to train theatre

personnel on posture and ergonomics. Preventive measures involve correct patient positioning, maintaining proper operating table height, appropriate positioning of monitors in arthroscopic surgeries, frequent position changes, short breaks for stretching, and use of a stool or footrest [26].

Conclusion.

Orthopaedic surgeons are exposed to occupational hazards in the operating theatre from radiation, surgical smoke, infection, hazardous noise and musculoskeletal injury all of which can be prevented or minimized by adopting proper prevention protocols and spreading awareness. Most of these hazards cause short-term and long-term health issues, including risk of malignancy. Some hazards like radiation and chemicals are fetotoxic posing a risk to pregnant female orthopaedic surgeons. The health of orthopaedic surgeons is also important to provide best medical and surgical care to orthopaedic patients. The British Orthopaedic Association (BOA) has put forward some guidelines on radiation safety which if followed will be beneficial to reduce risk of radiation hazards among orthopaedic surgeons. The International Council on Surgical Smoke Plume (ICSP) has given recommendations to reduce hazards of surgical smoke and Occupational Safety and Health Administration (OSHA) has set out guidelines for hazardous noise risk prevention. Apart from radiation exposure guidelines by BOA there are no regulatory bodies who specifically have set out guidelines for risk prevention for orthopaedic surgeons. More studies are required on this topic and more guidelines regarding prevention need to be framed by regulatory bodies.

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