GÓRSKI, Szymon, OKUPNIAREK, Joanna, BARTOSIK, Michalina, JĘTASIEWICZ, Igor, OBORSKI, Michał, OBORSKI, Krzysztof and MIARCZYŃSKI, Jakub. Complications after the removal of wisdom teeth – a literature review. Quality in Sport. 2026;50:67924. eISSN 2450-3118.
https://doi.org/10.12775/QS.2026.50.67924
https://apcz.umk.pl/QS/article/view/67924

The journal has been awarded 20 points in the parametric evaluation by the Ministry of Higher Education and Science of Poland. This is according to the Annex to the announcement of the Minister of Higher Education and Science dated 05.01.2024, No. 32553. The journal has a Unique Identifier: 201398. Scientific disciplines assigned: Economics and Finance (Field of Social Sciences); Management and Quality Sciences (Field of Social Sciences).
Punkty Ministerialne z 2019 - aktualny rok 20 punktów. Załącznik do komunikatu Ministra Szkolnictwa Wyższego i Nauki z dnia 05.01.2024 l.p. 32553. Posiada Unikatowy Identyfikator Czasopisma: 201398. Przypisane dyscypliny naukowe: Ekonomia i finanse (Dziedzina nauk społecznych); Nauki o zarządzaniu i jakości (Dziedzina nauk społecznych).
The authors declare that there is no conflict of interest regarding the publication of this paper.
Received: 02.01.2026. Revised: 15.01.2026. Accepted: 15.01.2026. Published: 20.01.2026.

Complications after the removal of wisdom teeth – a literature review

Szymon Górski[1]; ORCID ID: 0009-0006-1411-6524; szymon.gorski13@gmail.com
Joanna Okupniarek[2]; ORCID ID: 0009-0007-2446-4810; asiaokup22@wp.pl
Michalina Bartosik[3]; ORCID ID: 0009-0008-8541-1998; michalinabartosik03@gmail.com
Igor Jętasiewicz[2]; ORCID ID: 0009-0008-3351-6392; igor.jetasiewicz@icloud.com
Michał Oborski[2]; ORCID ID: 0009-0009-6170-6756; michal.oborski@wp.pl
Krzysztof Oborski[4]; ORCID ID: 0009-0004-4366-6897; krzysiek.oborski@wp.pl
Jakub Miarczyński[2]; ORCID ID: 0009-0004-5746-4786; jakub.miarczynski1@gmail.com

1 WSPSP - 'Provincial Dentistry' L.L.C., ul. Zdrowotna 6, 85-826 Bydgoszcz, Poland

2 Ludwik Rydygier Collegium Medicum in Bydgoszcz Nicolaus Copernicus University in Toruń, Jagiellońska 13/15, 85-067 Bydgoszcz, Poland

3 Medical University of Łódź, al. Tadeusza Kościuszki 4, 90-419 Łódź, Poland

4 Department of Internal Medicine, Diabetology and Clinical Pharmacology of the Central Clinical Hospital of the Medical University of Łódź, ul. Pomorska 251, 92-213 Łódź, Poland

* Correspondence: szymon.gorski13@gmail.com

Abstract:

Introduction: Third molars pose a significant clinical problem due to their late eruption and the associated lack of space in the dental arch, which often results in their malposition or impaction. From the point of view of dental surgery, the close proximity of third molars to important anatomical structures, such as the mandibular canal, is of particular importance. Such relationships affect the degree of difficulty of the procedure and increase the risk of post-operative complications. The aim of this study is to analyse complications occurring after third molar extraction, with particular emphasis on factors contributing to their development and recommended methods of prevention, based on scientific literature.

Purpose of work: The aim of this study was to analyse the most common complications occurring after the extraction of third molars, with particular emphasis on their incidence, etiological factors, and risk determinants. Additionally, the paper focuses on methods of prevention and management of post-extraction complications based on a review of current scientific literature. The analysis was intended to support clinical decision-making and improve patient safety and comfort during and after third molar surgery.

Material and methods: This study is a narrative review of the scientific literature concerning complications following third molar extraction. The analysis included textbooks and peer-reviewed articles in the fields of oral surgery and maxillofacial surgery. Literature sources addressed anatomical considerations, classification systems of impacted third molars, epidemiology of post-operative complications, risk factors related to the patient, tooth, and surgical procedure, as well as preventive and therapeutic strategies. No original clinical or experimental data were collected.

Results: Wisdom tooth extraction carries a significant risk of post-operative complications, the nature and frequency of which depend on many factors related to both the patient and the position of the tooth or the course of the procedure itself. Proper planning of the procedure, selection of the appropriate extraction technique and the dentist's experience are of great importance in reducing the risk of complications. Individualisation of treatment and the application of minimally invasive surgery principles form the basis of current clinical recommendations Prevention of complications following third molar extraction plays a key role in reducing the frequency and severity of post-operative discomfort and improving patient comfort. Further clinical studies should focus on identifying risk factors for complications following third molar extraction in order to obtain more conclusive clinical findings. It is also important to evaluate the effectiveness of modern, minimally invasive surgical techniques and preventive methods. In addition, studies comparing different preventive and educational strategies for patients, which could reduce the incidence of complications and improve post-operative comfort, would be useful.

Keywords: third molars; wisdom tooth extraction; post-extraction complications; alveolar osteitis; impacted teeth; oral surgery; risk factors; prevention

CHARACTERISTICS OF THIRD MOLARS

Upper wisdom teeth are the most variable in shape in the dentition, which reflects their vestigial nature. The most common forms have three cusps on the occlusal surface – two buccal and one palatal.

Lower wisdom teeth are less variable than upper ones, most often having four cusps on the occlusal surface, although their outline is less distinct than that of upper eighth teeth. These are the teeth most often affected by impaction. [1]

Epidemiological studies estimate the retention rate of third molars at 9.5-68%. [2]

Various classifications of eighth tooth retention are described in the literature. [2]

One of the most commonly used tools for assessing the difficulty of the procedure is Winter's classification, based on the angle of inclination of the long axis of the impacted tooth, which allows the technique of the procedure and the potential risk of complications to be predicted. [3]

Vertical retention	The long axes of the seventh and eighth lower teeth are parallel
Mesial-angular retention	The long axes of the seventh and eighth lower teeth converge in the coronoradial direction
Cheek-tongue retention	The long axis of the eighth tooth at the level of the roots of the seventh tooth runs in the anterior-posterior direction, where the crown is turned buccally
Horizontal retention	The long axes of the seventh and eighth lower teeth are perpendicular
Distal-angular retention	The long axes of the seventh and eighth lower teeth converge in the direction of the root
Reverse retention	The eighth tooth is positioned with its crown facing downwards, with various variations in the inclination of the tooth's long axis

Fig 1. Winter's classification describing the retention of lower third molars, taking into account the inclination of the long axes of the teeth.

According to Winter's classification, the greatest difficulty in the procedure is encountered with mesial-angular retention. [2]

The assessment of extraction difficulty is supplemented by the Pella and Gregory classification, which takes into account the position of the third molar in relation to the mandibular ramus and the occlusal plane. [4]

Vertical positions	
Level A	The occlusal surface of the lower eighth tooth at or above the occlusal line
Level B	The occlusal surface of the lower eighth tooth below the occlusal line, but above the neck of the lower seventh tooth
Level C	The occlusal surface of the lower eighth tooth below the neck of the lower seventh tooth
Position taking into account the amount of space between the distal surface of the seventh tooth and the anterior surface of the mandibular ramus	
Class I	Sufficient space to extract the lower eighth tooth
Class II	The crown of the lower eighth tooth is wider than the amount of space available between the distal surface of the lower seventh tooth and the anterior surface of the mandibular ramus
Class III	Complete lack of space for the eighth tooth

Fig 2. Classification according to Pell and Gregory. Describes the position of lower wisdom teeth based on the depth of their position in the mandible and the amount of space between the distal surface of the second molar and the anterior margin of the mandibular ramus.

According to the classification by Pell and Gregory, the greatest difficulty of the procedure is encountered at level B and class II.

Position a	Class A according to the Pella and Gregory classification. The occlusal surface of the retained upper eighth tooth is at the level of the occlusal surface of the upper seventh tooth.
Position b	Class B according to the Pella and Gregory classification. The occlusal surface of the retained upper eighth tooth is below the occlusal surface of the upper seventh tooth, but above its neck.
Position c	Class C according to the Pella and Gregory classification. The occlusal surface of the impacted upper eighth tooth is below the neck of the upper seventh tooth, but above ⅓ of its root.
Position d	Class C according to the Pella and Gregory classification.

	The occlusal surface of the impacted upper eighth tooth adheres to the apical part of the root of the upper seventh tooth.
Position e	Class C according to the Pella and Gregory classification. The occlusal surface of the retained upper eighth tooth adheres to the apices of the roots of the upper seventh tooth.

Fig 3. Archer's classification of the depth of the retained upper wisdom tooth in relation to the second upper molar.

The presence of a connection to the maxillary sinus adds an additional difficulty to the removal of an impacted upper molar. [2]
The use of both classification systems in treatment planning allows for a more precise assessment of the degree of difficulty of the procedure and increases the safety of the surgical procedure. [5]

THE MOST COMMON COMPLICATIONS AFTER EXTRACTION AND METHODS OF TREATMENT

1. Dry socket.

Post-extraction alveolar osteitis (AO), commonly referred to as 'dry socket', is one of the most common complications following tooth extraction. Its incidence is most often reported to be between 0.5% and 5%, but there are reports in the literature indicating significantly higher values. [6,7] This condition manifests itself as persistent, moderate to severe pain in the area of the extracted tooth, which often requires multiple follow-up visits for treatment and relief. The most widely accepted concept of AO pathogenesis is the fibrinolytic theory, according to which the blood clot in the alveolar socket breaks down or is lost. As a result, the bone tissue in the extraction socket becomes exposed. [7] The treatment of alveolar inflammation is primarily local, consisting of daily rinsing of the alveolar socket with saline or sodium bicarbonate solution and protecting the alveolar socket from irritants. In addition, dressings can also be used, which, in addition to protecting the alveolar socket, have analgesic and anti-inflammatory properties and promote granulation. These include, for example, Peruvian balsam, Alveogyl or the most popular preparation, Nipas. [2]

2. Infectious complications.

Soft tissue infections are one of the most common complications following surgical removal of third molars. They may involve periodontal tissues, oral mucosa, and in more advanced cases, also the intermuscular spaces of the face and neck. Factors predisposing to their development include difficult anatomical conditions, partial tooth retention, long surgery time, and poor oral hygiene in the postoperative period. [8,9] The most commonly observed symptoms of infection are increasing pain, soft tissue swelling, redness, elevated body temperature, and trismus. A clinical examination may reveal the presence of purulent contents in the alveolar socket area or oozing discharge. Untreated infections can lead to general complications such as osteomyelitis or the spread of infection to anatomical spaces in the head and neck. [9,10] Treatment includes proper preparation of the extraction site, drainage in the presence of an abscess, and targeted or empirical antibiotic therapy. It is also crucial to educate the patient on following post-operative recommendations, which significantly reduces the risk of soft tissue infections. [8,11]

Abscesses are a form of purulent infection that can spread to neighbouring tissues, both towards the superficial layers of the mucosa or skin and to the deep fascial spaces of the face and neck. Spontaneous drainage of abscesses onto the surface of the mucosa or skin with pus secretion occurs only in some cases. The development of purulent infections is influenced by many factors related to both microorganisms and the patient, such as the nature and location of the wound, its extent and depth, the possibility of contamination with exogenous material, the degree of tissue perfusion, the general health and functioning of the patient's immune system, as well as the number and virulence of microorganisms. Since surgical procedures involving third molars are not sterile procedures, postoperative infections are usually bacterial in aetiology, involving both aerobic and anaerobic microorganisms. [12]

3. Neurological complications.

The most serious surgical complications include damage to the inferior alveolar nerve (IAN) and lingual nerve (LN), which can result in permanent sensory disturbances. The incidence of these complications is approximately 0.35% for IAN and 0.69% for LN, respectively. [13]
Another possible complication of lower wisdom tooth extraction is secondary damage to the lingual nerve (LN) caused by displacement of the tooth into adjacent anatomical spaces, such as the parapharyngeal, pterygoid, sublingual or submandibular spaces. Displacement to the submandibular space is most common [14]. This phenomenon is most often the result of excessive pressure during the procedure, insufficient clinical and radiological assessment, a technically inappropriate surgical approach, and the individual anatomical characteristics of the patient. [15,16] Iatrogenic injuries to the inferior alveolar nerve should be treated depending on the severity of the injury, the time of diagnosis and the individual characteristics of the patient. In the case of mild neuropraxia injuries, conservative treatment is usually used, including the administration of corticosteroids and non-steroidal anti-inflammatory drugs (NSAIDs), while monitoring the patient's condition. [17] In the case of more serious injuries such as axonotmesis or neurotmesis, microscopic surgical treatment is a priority. In the case of avulsion injuries without tension, closed nerve reconstruction is recommended, while in the case of larger defects, nerve grafting is necessary, most often using the sural nerve or the great auricular nerve. [18]

4. Bleeding.

Bleeding is a common symptom immediately after tooth extraction and usually resolves spontaneously within the first few hours after the procedure. However, abnormal or prolonged bleeding can be a significant complication that requires clinical intervention. In some studies, the incidence of bleeding complications after third molar extraction was approximately 0.4% of all cases, although this may vary depending on the population and study methodology. [19]
Excessive bleeding after surgery can lead to haematoma formation, soft tissue tension, trismus and, in rare and severe cases, airway obstruction and significant deterioration in the patient's general condition. [20] Factors that increase the risk of bleeding after extraction include traumatic procedures, difficult removals, diseases that impair blood clotting, and the use of anticoagulants or antiplatelet drugs. [21] Bleeding from local causes is stopped with locally acting haemostatic agents. The most commonly used include: oxidised cellulose, haemostatic gelatin sponge, thrombin, calcium alginate. In addition, it is advisable to recommend that the patient rinse their mouth with a 10% tranexamic acid solution 4 times a day for a week after the procedure. In the case of systemic bleeding, treatment is selected based on the exact cause of the bleeding. However, the most common options are prothrombin complex concentrate, fresh frozen plasma, cryoprecipitate, or platelet concentrate. [2]

5. Delayed healing.

Delayed wound healing is a relatively rare complication after wisdom tooth removal, most often associated with infection, poor oral hygiene or immune system disorders in the patient. It manifests itself as prolonged pain, redness, swelling and delayed closure of the tooth socket. Risk factors include smoking, diabetes and previous radiation treatment in the oral cavity. [22,23]

6. Other.

Trismus, commonly known as lockjaw, occurs as a complication after extraction and is temporary. It is a defensive reaction of the body or a pathological symptom resulting from overloading the masticatory muscles or excessive force applied by the operator. It resolves spontaneously, and magnesium supplementation should be considered in cases of prolonged muscle contracture. Swelling and pain after extraction under normal conditions are a natural reaction of the body to surgery. They subside a few days after the procedure, and in the case of a prolonged condition, they subside after taking small doses of non-steroidal anti-inflammatory drugs (NSAIDs). Fracture of the mandibular alveolar process, mandibular fracture, and maxillary tumour are possible iatrogenic complications that may occur after wisdom tooth extraction. They are most often caused by incorrect surgical technique or excessive force used by the operator. Tooth aspiration is quite rare and causes the patient to cough. Usually, the provoked cough is effective in removing the tooth from the airways, but if the patient is unable to expel the tooth on their own, the Heimlich manoeuvre should be performed. An oro-sinus connection may develop as a complication after the removal of an upper tooth. It most often occurs after the extraction of the first upper molar, but there are also cases after the removal of upper wisdom teeth. [2]

RISK FACTORS

Complications following wisdom tooth removal, such as dry socket, infection or nerve damage, depend on many factors related to the patient and the surgical technique. The most important risk factors include: the degree of tooth retention, the difficulty of the procedure, the surgeon's experience, and the presence of chronic systemic diseases. [22]

1. Patient-dependent factors.

The patient's age plays an important role in the predisposition to complications. Younger people (aged 18–25) usually heal faster after extraction, with a lower risk of complications such as delayed healing or infections [23]. Older patients (>30–35 years) have increased bone stiffness and reduced regenerative capacity, which may result in a higher risk of complications and a longer recovery period [26]. Gender differences may have some influence on the incidence of complications after wisdom tooth removal. Studies indicate that women are more likely to report pain and discomfort after surgery, which may be due to different hormonal mechanisms and pain perception [22]. However, some analyses show no significant difference in the risk of complications such as infections or nerve damage between women and men [26].
Smoking significantly affects the healing of the extraction wound, as nicotine causes constriction of blood vessels, increased heart rate and blood pressure, leading to an increased risk of blood clots. As a result of tobacco use, an incomplete clot forms in the tooth socket, which can break down and cause inflammation of the socket. [2] The patient's general health

has a significant impact on the healing process after wisdom tooth extraction. Chronic diseases such as diabetes, cardiovascular disease or immune disorders can lead to delayed wound healing and an increased risk of post-operative infections [24]. Particularly in patients with uncontrolled diabetes, there is a higher incidence of inflammatory complications and difficulties in tissue regeneration [25]. In addition, the use of systemic medications, including anticoagulants and corticosteroids, may require modification of the surgical procedure and increased post-operative monitoring [5,24]. The patient's level of oral hygiene is important for the frequency of complications after wisdom tooth extraction. Inadequate control of bacterial plaque promotes the development of postoperative infections and may increase the risk of alveolar inflammation [24]. Patients with symptoms of gingivitis or periodontitis prior to surgery are more prone to inflammatory complications during the healing period [27]. Proper preparation of the oral cavity prior to extraction, including hygiene instruction and possible preventive measures, can significantly reduce the risk of adverse postoperative consequences [5,24]. The use of oral contraceptives is considered to be a factor increasing the risk of dry socket after wisdom tooth extraction. This mechanism is related to the effect of oestrogens on fibrinolysis processes, which may lead to destabilisation of the postoperative clot [28]. This risk appears to be particularly significant in women taking hormonal preparations in the perioperative period [24,28].

2. Tooth-dependent factors.

The degree of wisdom tooth impaction has a significant impact on the difficulty of the procedure and the frequency of post-extraction complications. Completely impacted teeth, especially those with an unfavourable anatomical position, are associated with a higher risk of tissue trauma, prolonged procedure time and an increased frequency of inflammatory complications [22]. It has been shown that as the degree of impaction increases, so does the risk of swelling, postoperative pain and dry socket [23]. Radiological assessment of the degree of impaction prior to surgery is crucial in planning the surgical procedure and reducing the risk of complications [5,22]. The most unfavourable position of the lower wisdom tooth is the mesial-angular position according to Winter and level B and class II according to Pell and Gregory. [2] The close position of the wisdom tooth roots to the mandibular canal increases the risk of neurological complications, in particular temporary or permanent sensory disturbances in the area innervated by the inferior alveolar nerve, which requires careful radiological assessment before surgery. [29] The anatomical structure of wisdom tooth roots significantly affects the extraction process and the risk of postoperative complications. Curved, bifurcated or irregularly shaped roots can make tooth removal difficult and increase the risk of root fractures and injury to surrounding anatomical structures [5]. In addition, the presence of fused roots or roots of varying numbers may necessitate more extensive surgical intervention, which is associated with greater tissue trauma and prolonged healing time [30].

3. Factors dependent on the procedure and the surgeon.

The prolonged duration of wisdom tooth extraction is considered a significant factor increasing the risk of postoperative complications. Longer exposure of tissues to surgical trauma promotes increased inflammatory response, swelling and pain after surgery [24]. Studies have shown that the duration of surgery correlates with the incidence of infection and dry socket, which often reflects the greater anatomical and technical complexity of the procedure. [5] The experience of the surgeon plays an important role in the frequency and type of complications after wisdom tooth extraction. Procedures performed by less experienced doctors are associated with longer

operating times and greater tissue trauma, which may increase the risk of inflammatory complications and postoperative pain [24].

METHODS OF PREVENTING COMPLICATIONS

1. Surgical techniques.

One of the most important factors is minimally invasive tooth extraction. It is crucial to keep the alveolar walls intact, separate multi-rooted teeth, use appropriate instruments, control the force applied, refrain from curettage of the extraction socket, and shorten the duration of the procedure. [31] Protection of anatomical structures is one of the key elements in the prevention of complications during surgical removal of wisdom teeth. A thorough preoperative assessment, including analysis of radiological examinations, allows the identification of the relationship of the tooth to adjacent structures, such as the mandibular canal or maxillary sinus, which enables appropriate planning of the scope of the procedure [31]. The use of atraumatic surgical techniques, including controlled osteotomy and tooth sectioning, helps to reduce soft tissue and bone trauma and reduces the risk of damage to nerves and other anatomical structures [5].

2. Pharmacoprophylaxis.

The administration of antibiotics should be considered in two clinical situations. The first is a high risk of bacteraemia in groups at the highest risk of infective endocarditis. Prophylactic pharmacotherapy is then used, most often in dental surgery in the form of a one-shot dose. This group of patients includes those with a history of IZW, congenital cyanotic heart defects, and patients with an artificial valve or artificial material used for surgical repair of a defective valve. The second group of patients who require therapeutic pharmacotherapy in the event of general complications after extraction, such as fever, dehydration, dizziness, tachycardia or general weakness. [2] The use of non-steroidal anti-inflammatory drugs (NSAIDs) in the perioperative period helps to reduce inflammation, pain and swelling after wisdom tooth extraction [5]. Early administration of NSAIDs can improve patient comfort and indirectly reduce the risk of complications resulting from excessive inflammatory response [31]. The use of antiseptic rinses, in particular preparations containing chlorhexidine, before and after wisdom tooth extraction may reduce the bacterial load in the oral cavity and limit the risk of inflammatory complications, including alveolar inflammation [32]. The most commonly used form of haemorrhage prevention before dental surgery is the use of a 10% tranexamic acid solution for mouth rinsing. [2]

DISCUSION

An analysis of available scientific publications clearly indicates significant variation in the type and frequency of complications following the extraction of third molars, commonly known as ‘wisdom teeth’, which is mainly due to different assessment criteria and differences in the studies conducted. The complications most frequently described by authors are dry socket, as well as pain and swelling in the post-operative area, while neurological complications associated with nerve fibre damage are much less common, although they are characterised by long-lasting effects. However, the vast majority of authors agree that the degree of tooth retention and its relationship to important anatomical structures significantly influence the risk of post-extraction complications.

In the medical literature, there are still doubts about the validity of routine prophylactic antibiotic therapy for third tooth extraction. According to current recommendations, there is no clear evidence of the effectiveness of such treatment. Authors often emphasise the lack of evidence for a significant reduction in the risk of complications after taking antibiotics, while at the same time there is a risk of adverse effects and the development of antibiotic resistance. Prophylactic antibiotic therapy should be implemented in patients at increased risk of infection. The prophylactic removal of asymptomatic impacted wisdom teeth remains a controversial issue for many authors.

The impact of the doctor's experience on the course of the procedure and the occurrence of complications is also subject to debate. There is a belief that procedures performed by more experienced clinicians are usually shorter and cause less tissue trauma, which translates into a milder healing process. An additional issue is the fact that proper planning of the procedure and following the principles of minimally invasive surgery can significantly reduce the risk of post-operative complications, regardless of the surgeon's experience.

According to current recommendations, the decision to remove a wisdom tooth should be tailored to the patient and their needs, based on an analysis of the risks of extraction, as the mere presence of an impacted tooth is not a clear indication for its removal. Extraction is indicated in the case of symptoms associated with an impacted eighth tooth, such as recurrent inflammation, odontogenic cysts or pain in the area of the tooth.

Disclosure

Author's Contributions:

Conceptualization: Szymon Górski, Joanna Okupniarek, Michalina Bartosik, Igor Jętasiewicz

Formal analysis: Michał Oborski, Krzysztof Oborski, Igor Jętasiewicz, Jakub Miarczyński

Investigation: Joanna Okupniarek, Michalina Bartosik, Jakub Miarczyński

Writing rough preparation: Szymon Górski, Joanna Okupniarek, Michalina Bartosik, Igor Jętasiewicz, Krzysztof Oborski, Michał Oborski, Jakub Miarczyński

Writing review and editing: Szymon Górski, Igor Jętasiewicz

All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Avability Statement: Not applicable.

Conflicts of Interest: The authors declare no conflict of interest.

Reference

1. Łasiński W. *Anatomia dla stomatologów*. Wrocław: Elsevier Urban & Partner; 2010.

2. Rahnama M. *Chirurgia stomatologiczna i twarzowo-szczękowa*. Lublin: Wydawnictwo Czelej; 2019.

3. Winter GB. *Principles of Exodontia as Applied to the Impacted Third Molar.* St. Louis: American Medical Book Company; 1926.

4. Pell GJ, Gregory BT. *Impact of mandibular third molars on the angle of the mandible.* Journal of Dental Research. 1933;13:330–338.

5. Peterson LJ, Ellis E, Hupp JR, Tucker MR. *Contemporary Oral and Maxillofacial Surgery*. 6th ed. St. Louis: Mosby; 2014.

6. Chow O, Wang R, Ku D, Huang W. *Alveolar Osteitis: A Review of Current Concepts.* J Oral Maxillofac Surg. 2020 Aug;78(8):1288-1296. Doi: 10.1016/j.joms.2020.03.026

7. Ghosh A, Aggarwal VR, Moore R. *Aetiology, Prevention and Management of Alveolar Osteitis-A Scoping Review*. J Oral Rehabil. 2022 Jan;49(1):103-113. Doi: 10.1111/joor.13268

8. Peterson LJ, Ellis E, Hupp JR, Tucker MR. *Contemporary Oral and Maxillofacial Surgery*. 6th ed. St. Louis: Mosby; 2014.

9. Hupp JR, Ellis E, Tucker MR. *Chirurgia jamy ustnej i szczękowo-twarzowa.* Wrocław: Elsevier Urban & Partner; 2015.

10. Bataineh AB. Postoperative complications of third molar surgery. *Journal of Oral and Maxillofacial Surgery.*2001;59(1):50–54.

11. Miloro M, Ghali GE, Larsen P, Waite P. *Peterson's Principles of Oral and Maxillofacial Surgery.* 3rd ed. Shelton: PMPH-USA; 2012.

12. Pippi R, Giuliani U. Suppurative infections after lower third molar surgery: a systematic review. *Med Oral Patol Oral Cir Bucal*. 2025;30(5):e721–e729. Doi: 10.4317/medoral.27213. PMCID: PMC12395593.

13. Iwanaga J, Kunisada Y, Masui M, Obata K, Takeshita Y, Sato K, Kikuta S, Abe Y, Matsushita Y, Kusukawa J, et al. *Comprehensive review of lower third molar management: A guide for improved informed consent.* Clin. Anat. 2021;34:224–243. Doi: 10.1002/ca.23693.

14. Cheung LK, Leung YY, Chow LK, Wong MC, Chan EK, Fok YH. *Incidence of neurosensory deficits and recovery after lower third molar surgery: A prospective clinical study of 4338 cases.* Int. J. Oral Maxillofac. Surg. 2010;39:320–326. Doi: 10.1016/j.ijom.2009.11.010.

15. Goldberg MH, Nemarich AN, Marco WP. *Complications after mandibular third molar surgery: A statistical analysis of 500 consecutive procedures in private practice.* J. Am. Dent. Assoc. 1985;111:277–279. Doi: 10.14219/jada.archive.1985.0098

16. Aznar-Arasa L., Figueiredo R., Gay-Escoda C. *Iatrogenic displacement of lower third molar roots into the sublingual space: Report of 6 cases.* J. Oral Maxillofac. Surg. 2012;70:e107–e115. Doi: 10.1016/j.joms.2011.09.039

17. *Are women more susceptible than men to iatrogenic inferior alveolar nerve injury in dental implant surgery?* Pääsky E, Suomalainen A, Ventä I. Int J Oral Maxillofac Surg. 2022;51:251–256. Doi: 10.1016/j.ijom.2021.05.008

18. *Prevention of iatrogenic inferior alveolar nerve injuries in relation to dental procedures.* Renton T. Dent Update. 2010;37:350–363. Doi: 10.12968/denu.2010.37.6.350

19. Guido RS, Pièrre PP, Beatrice M, Bernd S, Michael CL. *The most common complications after wisdom-tooth removal: part 1: a retrospective study of 1,199 cases in the mandible. PubMed.* 2014; 2014;124(10):1042-6, 1052-6. Doi: 10.61872/sdj-2014-10-01

20. Risks associated with removal of M3Ms – bleeding and hematoma formation. *Dental and Medical Problems.*

21. Complications of Dental Extractions – Bleeding complications after extraction. *Geeky Medics.*

22. Renton T, Smeeton N, McGurk M. *Factors influencing delayed healing following third molar extraction.* Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2001;92(3):251-255. Doi: 10.1038/sj.bdj.4801052

23. Blondeau F, Daniel NG. *Extraction of impacted mandibular third molars: postoperative complications and their risk factors.* J Can Dent Assoc. 2007;73(4):325.

24. Bui CH, Seldin EB, Dodson TB. "Types, frequencies, and risk factors for complications after third molar extraction." *J Oral Maxillofac Surg.* 2003;61(12):1379–1389. Doi: 10.1016/j.joms.2003.04.001

25. Lalla RV, D'Ambrosio JA. "Dental management considerations for the patient with diabetes mellitus." *J Am Dent Assoc.* 2001;132(10):1425–1432.

26. Bataineh AB. "Complications of impacted mandibular third molar surgery." *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* 2000;90(1):63–67.

27. Adeyemo WL, Ladeinde AL, Ogunleye MO. "Clinical evaluation of post-extraction complications." *J Contemp Dent Pract.* 2006;7(1):40–49.

28. Sweet JB, Butler DP. "The relationship of smoking and oral contraceptives to localized osteitis." *J Oral Surg.*1979;37(10):732–735.

29. Rood JP, Shehab AA. "The radiological prediction of inferior alveolar nerve injury during third molar surgery." *Br J Oral Maxillofac Surg.* 1990;28(1):20–25. Doi: 10.1016/0266-4356(90)90005-6

30. Archer WH. *Oral and Maxillofacial Surgery.* 5th ed. Saunders; 1975.

31. Dominiak M. (red.). *Podstawy chirurgii stomatologicznej*. Wrocław: Elsevier Urban & Partner; 2016.

32. Daly B, Sharif MO., Newton T, Jones K, Worthington HV. "Local interventions for the management of alveolar osteitis." *Cochrane Database Syst Rev.* 2012;(12):CD006968. Doi: 10.1002/14651858.CD006968.pub2