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SCIENCE, TECHNOLOGY AND GLOBAL CHALLENGES



PROCEEDINGS OF VIII INTERNATIONAL SCIENTIFIC AND PRACTICAL CONFERENCE
APRIL 2-4, 2026

TOKYO
2026

UDC 001.1

The 8th International scientific and practical conference "Science, technology and global challenges" (April 2-4, 2026) CPN Publishing Group, Tokyo, Japan. 2026. 440 p.

ISBN 978-4-9783419-7-6

The recommended citation for this publication is:
Ivanov I. Analysis of the phaunistic composition of Ukraine // Science, technology and global challenges. Proceedings of the 8th International scientific and practical conference. CPN Publishing Group. Tokyo, Japan. 2026. Pp. 21-27. URL: https://sci-conf.com.ua/viii-mizhnarodna-naukovo-praktichna-konferentsiya-science-technology-and-global-challenges-2-4-04-2026-tokio-yaponiya-arhiv/.

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UDC 616.31-073.75:616.716.4-001.5-036

DIAGNOSTIC VALUE OF MODERN RADIOLOGICAL METHODS IN THE DIAGNOSIS OF MANDIBULAR FRACTURES: A CLINICAL PERSPECTIVE

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Abstract: Computed tomography is one of the leading diagnostic modalities in non-gunshot traumatic injuries of the mandible, which is primarily due to its high spatial resolution and considerable diagnostic accuracy. The use of CT with three-dimensional reconstruction in 28% of patients made it possible not only to obtain a detailed visualization of the nature and extent of the disruption of bone integrity, but also to assess the spatial relationship of bone fragments with a high degree of precision.

This contributed to a more substantiated individualization of treatment strategies, refinement of the indications for surgical intervention, and the selection of the most appropriate method of surgical management.

The application of this diagnostic approach significantly improved treatment outcomes, reduced the incidence of complications, and also made it possible to shorten the duration of hospital stay as well as the rehabilitation period.

Keywords: non-gunshot traumatic mandibular fracture, diagnostics, radiography, computed tomography.

Among traumatic injuries of the maxillofacial region, fractures of the mandible continue to account for the majority. According to both domestic and international literature sources, they constitute from 48% to 82% of all fractures of the facial skeleton. The analysis of recent publications and our own studies conducted over the past years has not revealed a tendency toward a significant decrease in the statistical indicators of such injuries; however, it indicates a change in the nature of trauma, namely an increase in the proportion of multiple comminuted fractures with displacement of fragments [1, 2].

The treatment of such patients remains one of the most complex and relevant problems in maxillofacial traumatology, as it is directly associated with the risk of various inflammatory and functional complications [3, 4].

Aim of the study: to compare the diagnostic capabilities of facial skull radiography and computed tomography in the detection of non-gunshot traumatic mandibular injuries in order to improve the effectiveness of specialized medical care, prevent complications, and reduce the duration of the rehabilitation period in patients.

Materials and methods: the study was based on the analysis of 72 medical records of patients with non-gunshot traumatic mandibular injuries who were treated in the Department of Head and Neck Surgery of the Municipal Non-Profit Enterprise of the Kharkiv Regional Council “Regional Clinical Hospital” during 2023. The age of the examined patients ranged from 18 to 64 years; men predominated numerically — 63 individuals (88%), whereas women accounted for 9 patients (12%). Diagnostic procedures included clinical, radiological, and laboratory examinations in accordance with the approved medical standards. Radiographic examination of the facial skull was performed in all patients, while in 28% of cases computed tomography with three-dimensional visualization was additionally carried out. A comparative analysis of the obtained radiological data made it possible to assess the effectiveness of the chosen treatment strategy and to adjust it during the follow-up period.

Results: our own observations and the analysis of skull radiographs obtained in different projections revealed that in some cases there were discrepancies between the clinical presentation and radiological findings, which required additional computed tomography with three-dimensional reconstruction.

The comparison of the obtained results led to a modification of the treatment strategy, in particular, clarification of the indications for surgical methods of reduction and fixation (osteosynthesis) of mandibular fragments in cases of significant displacement, especially in the region of the angle, ramus, and processes outside the dental arch. The localization of non-gunshot traumatic mandibular injuries corresponded to the average statistical data reported in the literature.

Conclusions: computed tomography is one of the leading diagnostic methods in non-gunshot traumatic mandibular injuries, which is due to its high spatial resolution and significant diagnostic value. The use of CT with 3D reconstruction in 28% of patients made it possible not only to visualize in detail the nature and extent of the disruption of bone integrity, but also to assess the spatial relationship of bone fragments.

This contributed to a more substantiated individualization of treatment tactics, refinement of the indications for surgical intervention, and selection of the optimal method of surgical treatment. The application of this approach made it possible to increase treatment effectiveness, reduce the number of complications, and shorten the duration of hospital stay as well as the rehabilitation period.

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