

THE ROLE OF TELEMEDICINE IN THE DIAGNOSIS OF PATIENTS WITH COMBINED INJURIES OF THE MAXILLOFACIAL SKELETON

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Abstract. Combined injuries of the maxillofacial skeleton require rapid and accurate diagnosis to ensure timely treatment and prevent complications. In recent years, telemedicine has become an important tool in trauma diagnostics, enabling remote consultation, image sharing, and specialist involvement. This study evaluates the role of telemedicine in the diagnostic process of patients with combined maxillofacial injuries. A total of 140 patients were analyzed using clinical examination, radiological imaging, and telemedicine-based consultation systems. The results demonstrated that telemedicine significantly improves diagnostic accessibility, reduces time to diagnosis, and enhances the accuracy of clinical decision-making. The study confirms that telemedicine is an effective supplementary tool in the management of maxillofacial trauma, especially in emergency and remote healthcare settings.

Keywords: telemedicine, maxillofacial trauma, diagnosis, remote consultation, digital health, facial fractures.

Introduction. Combined injuries of the maxillofacial skeleton are complex traumatic conditions that require immediate and accurate diagnostic evaluation. These injuries often involve multiple anatomical structures, including the mandible, maxilla, zygomatic bone, orbital walls, and nasal bones. Delayed or incorrect diagnosis may lead to serious functional and aesthetic complications.

Access to specialized maxillofacial surgeons and radiologists is not always available, particularly in emergency or rural healthcare settings. In such situations, telemedicine provides an innovative solution by enabling remote communication between healthcare providers, real-time sharing of imaging data, and specialist consultation.

Telemedicine has rapidly developed due to advances in digital technology, internet connectivity, and medical imaging systems. It allows faster decision-making and improves the quality of trauma care. The aim of this study was to evaluate the effectiveness and diagnostic value of telemedicine in patients with combined injuries of the maxillofacial skeleton.

Materials and Methods. This retrospective clinical study included 140 patients with combined maxillofacial skeletal injuries treated at a multidisciplinary hospital. Patients aged between 18 and 65 years were included in the study. All patients underwent standard clinical examination and radiological imaging, including X-ray

and computed tomography (CT). In addition, telemedicine systems were used to transmit imaging data and clinical findings to remote maxillofacial specialists for consultation.

The telemedicine platform enabled real-time image sharing, video conferencing, and collaborative diagnostic evaluation. Diagnoses made via telemedicine were compared with on-site specialist evaluations and surgical findings.

The effectiveness of telemedicine was assessed based on diagnostic accuracy, time to diagnosis, and clinical decision concordance. Statistical analysis was performed using descriptive methods.

Results. The use of telemedicine significantly improved the diagnostic process in patients with combined maxillofacial injuries. Diagnostic accuracy increased to 93% when telemedicine consultation was used, compared to 85% with standard on-site evaluation alone. The average time required to establish a final diagnosis decreased from 24–36 hours to 6–10 hours when telemedicine was applied. In 21% of cases, remote specialists provided additional diagnostic insights that changed or refined the initial diagnosis. These cases mainly involved complex multi-fragment fractures and orbital involvement.

Telemedicine also improved access to specialist care in emergency and rural settings, where maxillofacial surgeons were not immediately available. Overall clinical decision agreement between local physicians and remote experts was observed in 90% of cases.

Discussion. The findings of this study demonstrate that telemedicine plays a significant role in improving the diagnostic process of combined maxillofacial injuries. It allows rapid access to specialist consultation, which is crucial in trauma management where time is a critical factor. One of the main advantages of telemedicine is the ability to overcome geographical barriers and provide expert-level consultation in underserved areas. This is particularly important in maxillofacial trauma cases, where accurate interpretation of CT images is essential for treatment planning.

Telemedicine also enhances interdisciplinary collaboration between emergency physicians, radiologists, and maxillofacial surgeons. However, limitations include dependence on internet connectivity, data security concerns, and the need for high-quality imaging systems. Despite these challenges, telemedicine continues to expand as a valuable tool in modern healthcare.

Conclusion. Telemedicine is an effective and reliable tool in the diagnosis of combined injuries of the maxillofacial skeleton. It improves diagnostic accuracy, reduces time to diagnosis, and enhances access to specialized care. The integration of telemedicine into clinical practice supports timely decision-making and improves patient outcomes, particularly in emergency and remote healthcare settings. Therefore,

telemedicine should be considered an important component of modern maxillofacial trauma management.

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