Purpose: To verify the possibility of using *.stl models for the assessment of maxillofacial traumatic injuries by FISS and MFISS severity scores in the remote mode of forensic evaluation.
Methods: Quantitative assessment of maxillofacial traumas was made by facial injury severity score (FISS) and maxillofacial injury severity score (MFISS) among 27 patients who have undergone CBCT after road-traffic accidents. Initially, FISS and MFISS scores were estimated based on clinical examination, medical documentation, and obtained X-ray data-sets (FISS1 and MFISS1). *.dcm-files of patients were converted into *.stl-files via InVesalius software (CTI, Brazil) and sent to the forensic dental experts with all the needed descriptive information regarding clinical characteristics of maxillofacial traumas, but without access to original *.dcm files. In remote mode, experts estimated injury severity by FISS2 and MFISS2 scores.
Results: Mean scores for maxillofacial traumatic injuries based on clinical examination, medical documentation, and obtained X-ray data-sets were following: 3.54±1.03 and 16.29±5.21 for FISS1 and MFISS1 respectively; while mean FISS2 and MFISS2 scores were 2.98±1.74 and 13.32±8.73, respectively. Statistical correspondence between FISS1 and FISS2 scores reached r=0.84 ($p<0.05$), while such correspondences between MFISS1 and MFISS2 scores reached 0.92 ($p<0.05$).
Conclusions: Even though analysis of stl-files obtained from patients with maxillofacial traumatic injuries provoked underestimation of FISS and MFISS scores with an increase of standard errors deviations, such a digital approach also provides the possibility for quick assessment of preliminary trauma severity by a forensic dental expert in the remote mode of evaluation.

Keywords: Digital; maxillofacial trauma; severity; stl model

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Digital Approaches in Forensic Dentistry Practice: Clustering or Fractal Differentiation?

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Purpose: To evaluate the effectiveness of using nurb-to-nurb, line-to-line, and node-to-node superimposition principles during the person identification procedure based on dental status comparison considering clustering and fractal differentiation of targeted points.
Methods: The study included a graphical analysis of 45 skulls that were originally scanned with the use of a CBCT device. Forty-five original *.dcm files were converted into 90 *.stl files (2 copies of each original *.dcm) after image processing. One set of 45 *.stl files was saved, while another 45 copies were deformed with alteration of graphical object integrity via MeshMixer Sofware. Forty-five deformed graphical objects of the skulls were superimposed with originally saved stl-objects using nurb-to-nurb, line-to-line, and node-to-node superimposition principles considering clustering and fractal differentiation of targeted points within original CBCT-files.
Results: Nurb-to-nurb superimposition provides the highest validity with the level of "successful identification" up to 79.2±8.4% and the level of "possible identification" up to 94.4±3.2%. The level of graphical disintegration of study object ≥ 45% was considered critical from the point of possibility to reach "successful identification" result. Fractal differentiation provides a higher level of sensitivity regarding truthful identification as compared to the clustering approach both in integral and deform conditions of analyzed skulls ($p < 0.05$).
Conclusion: The development of modern digital approaches expands the validity of methods used for the forensic-dental identification process during post-mortem expertise. Digitalization is forming a specific pool of quantitative criteria that also helps to estimate the credibility of diagnosed changes during comparative or reconstructive identification.

Keywords: bone analysis; clustering; fractal; superimposition

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Optimization of full zirconium crowns manufacturing using hybrid digital approach under the sanitary restrictions during Covid-19 pandemic and limited clinical access to intraoral scanner

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Purpose: To assess clinical optimization of hybrid digital approach for full zirconium crowns manufacturing developed under sanitary restrictions during COVID-19 pandemic considering specific economical interaction of "low budget clinic–high budget dental laboratory".
Methods: Developed primary approach included following steps: 1) taking analog impression by dental clinician; 2) digitalization of impression by mobile dental technician team outside the dental clinic; 3) transfer of obtained *.stl file to the dental lab; 4) inversion of *.stl file for dental model production with further CAD-CAM manufacturing of zirconium crowns; and 5) delivery of manufactured crowns to the clinic in a non-contact manner. The clinical effectiveness of such an approach was assessed by criteria of clinical time expenditures associated with appropriate crowns fitting and fixation, clinical marginal fit, and risk reduction considering COVID-19 transmission.
Results: Analysis of 116 cases demonstrated that in 81.89% of cases, time expenditures associated with appropriate crowns fitting and fixation were not statistically different ($p > 0.05$) from those needed for crowns manufactured by usual digital protocols. Clinical marginal fit in 70.68% cases was classified as "excellent", in 21.55% cases – as "good", and in 7.76% cases – as "appropriate". Risk reduction of COVID-19 transmission considering a possible way of disease spread varied in the range of 34.61-56.78%.
Conclusions: A proposed approach for full zirconium crowns manufacturing developed specifically under sanitary restrictions during the COVID-19 pandemic optimizes the quality of dental care considering limited clinical access to an intraoral scanner while demonstrating sufficient clinical effectiveness in the means of marginal crowns fit and clinical time expenditures.

Keywords: COVID-19; digital approach; sanitary restrictions; zirconium crown

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Can EPS collaborate with the acquisition of the supra-implant emergence profiles simultaneously to the dental implant's digital transference?