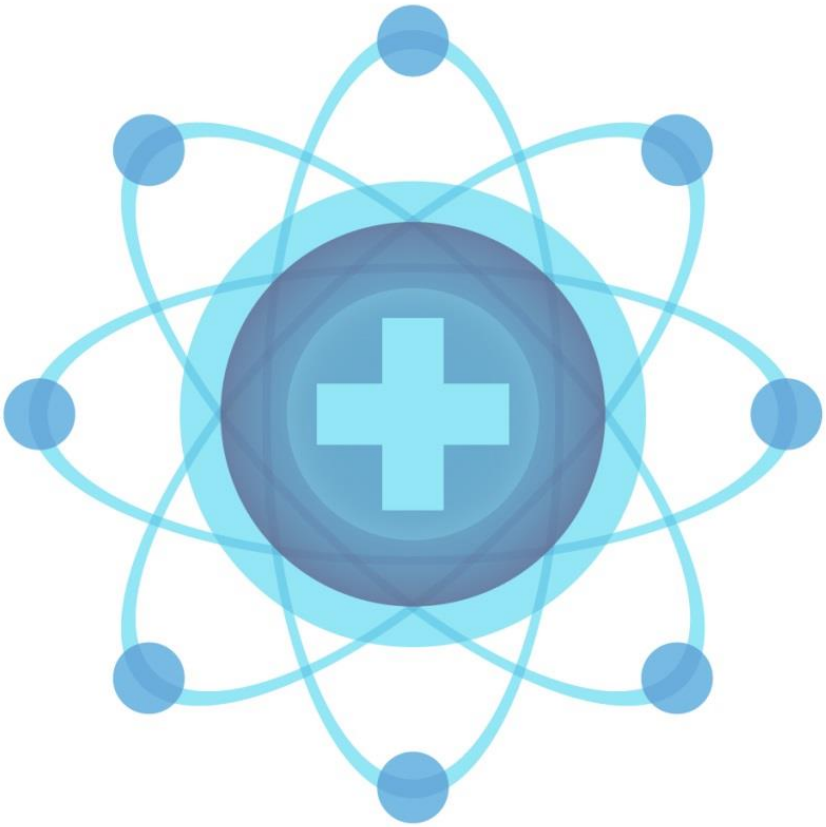

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Clinical and radiological assessment of the dental implantation technique in patients with complete absence of teeth using the DICOM program.

Dustmatov J.E.[1], Makhkamova F.T.[2], Gulyamov S.S.[2]
1- Tashkent State Dental Institute
2- Tashkent Pediatric Medical Institute
Corresponding author: pulatabilov1985@mail.ru

Abstract. According to data from various regions of Uzbekistan, patients with a complete absence of teeth (POD) are encountered for the first time in the 45-49 age group. By 2020, the number of patients with POI in Uzbekistan will exceed 15 million people, and then among our adult fellow citizens every five years, this number is expected to increase by 3-5%.During follow-up (6-18 months) after prosthetics, signs of peri-implant mucositis in the form of hyperemia, edema were observed in the area of 4 out of 100 (4.00%). Such patients were prescribed Traumeel S. During the study of suppuration, the presence of ulcerations, fistulas, pain was not noticed, and complaints of these manifestations were absent, the phenomena of mucositis could be quickly stopped. No cases of peri-implantitis were diagnosed. Radiographically vertical bone atrophy, i.e. the appearance of peri-implant pockets was not detected. Insignificant horizontal atrophy was observed in 2 implants by the end of 18 months (2.00%) and averaged 0.62 ± 0.13 mm. In the control group (39 patients), 39 complete removable prostheses were made, supported by 98 implants. During follow-up (6-18 months after prosthetics), signs of peri-implant mucositis in the form of hyperemia and edema were observed in the area of 8 implants (8.10%). At the same time, loosening was determined in 4 of them (4.08%). During the study, no suppuration, the presence of fistulas, or pain was detected. There were no complaints about these manifestations. The phenomena of mucositis could be quickly stopped. But it should be added that 1 case of peri-implantitis was diagnosed in this group.

Conclusions. The loss of bone tissue in the main group was at the level of 0.54 ± 0.21 mm, while in the control group it was 0.74 ± 0.32 mm. Moreover, foreign studies have shown that in the presence of 3 implants, bone loss ranged from 0.5 ± 0.46 mm to 0.7 ± 0.76 mm.

Keywords: DICOM program; complete absence of teeth; peri-implantitis; mucositis; implants; dental computed tomography

Introduction. According to data from various regions of Uzbekistan, patients with a complete absence of teeth (CAT) are encountered for the first time in the 45-49 age group. At the age of 55-59 years, every fourth surveyed has the named pathology, and for the age of 65-69 years this figure is already 42.8%. The overall prevalence of complete absence of teeth for different regions of our country ranges from 8.2 ± 0.46 to 9.3 ± 0.67. By 2020, the number of patients with CAT in Uzbekistan will exceed 15 million people, and then among our adult fellow citizens every five years, this number is expected to increase by 3-5%.

Abroad, the number of patients with CAT in the United States is 27 million, and although the reduction in the prevalence of CAT is declared a major medical goal

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in the United States, according to forecasts for the first 3-5 decades of the 21st century, this prevalence will grow steadily [5, 12, 23, 27, 30 , 38]. According to some foreign authors, CAT occurs already in patients aged 34 years [1, 2, 4, 8, 14, 25, 31].

In modern conditions, patients with CAT have every opportunity to abandon conventional removable prostheses in favor of non-removable prosthetic structures supported by implants.

The manufacture of implant-supported dentures can significantly improve the chewing function and improve the quality of life of patients with POP. The use of complete removable dentures with implant fixation in comparison with conventional removable prosthetics increases patient satisfaction with the results of treatment by more than 2 times. Satisfaction of patients with CAT also significantly increases after conditionally removable and fixed prosthetics [6, 11, 13, 17, 20-22, 28, 33, 34, 36,35].

Thus, dental implantation can be considered not only one of the most promising options for orthopedic treatment of patients with POP, but also considered as the basis for effective orthopedic treatment and improving the quality of life of this category of patients [3, 7, 15, 19, 24, 29, 32, 39].

As you know, the installation of any implants requires increased attention and absolute accuracy from the implantologist. The lack of a clear planning of the placement of implants in the bone tissue, their installation depending only on the clinical situation, which is assessed only visually on the basis of our own clinical experience and X-ray data, can lead to incorrect implant placement. However, in dental implantation, CT examination itself without specialized software and 3-D modeling is not informative enough [9,10,16,18,26,37,40]. There are various computer programs that allow the planning and placement of implants with a predetermined result with the presence of parallel suprastructures. One of these programs is DICOM (Implant-assistant).

The low quality of life of patients, especially those with complete loss of teeth, against the background of a relatively high frequency of complications that occur after the installation of dental implants, confirms the postulate that there is still a shortage of methods with a high efficiency of choice of tactics and sequence of orthopedic treatment of this pathology, indicating on the relevance of this study.

Purpose of the study. To evaluate the effectiveness of using the DICOM program in patients with complete absence of teeth according to the data of dental computed tomography at the stage of the dental implantation technique.

Materials and research methods. In total, we examined 80 patients with complete loss of teeth, of which 29 were men, 51 were women. The age of the patients was 51-66 years (mean age 58.5 ± 4.5 years).

Implant prosthetics was carried out at the Department of Advanced Training of Prosthetic Dentistry TGSI. Implants from Osstem Implant (South Korea) were used.

All patients were divided into 2 groups: group 1 (main) - 41 patients, of whom 14 were men, 27 women (mean age 56.7 ± 4.2 years), group 2 (control) - 39 patients were included 15 men, 24 women (mean age 59.5 ± 4.7 years).

Patients were separated by simple randomization.

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All patients signed written consent to participate in the study.

Research methods.

1. Clinical - included a standard technique, which consisted of examination, examination of the oral cavity. Clinical evaluation included determination of the severity of gingival recession, the severity of the implant, bleeding of the peri-implant cuff, inflammation, the level of oral hygiene and prostheses.

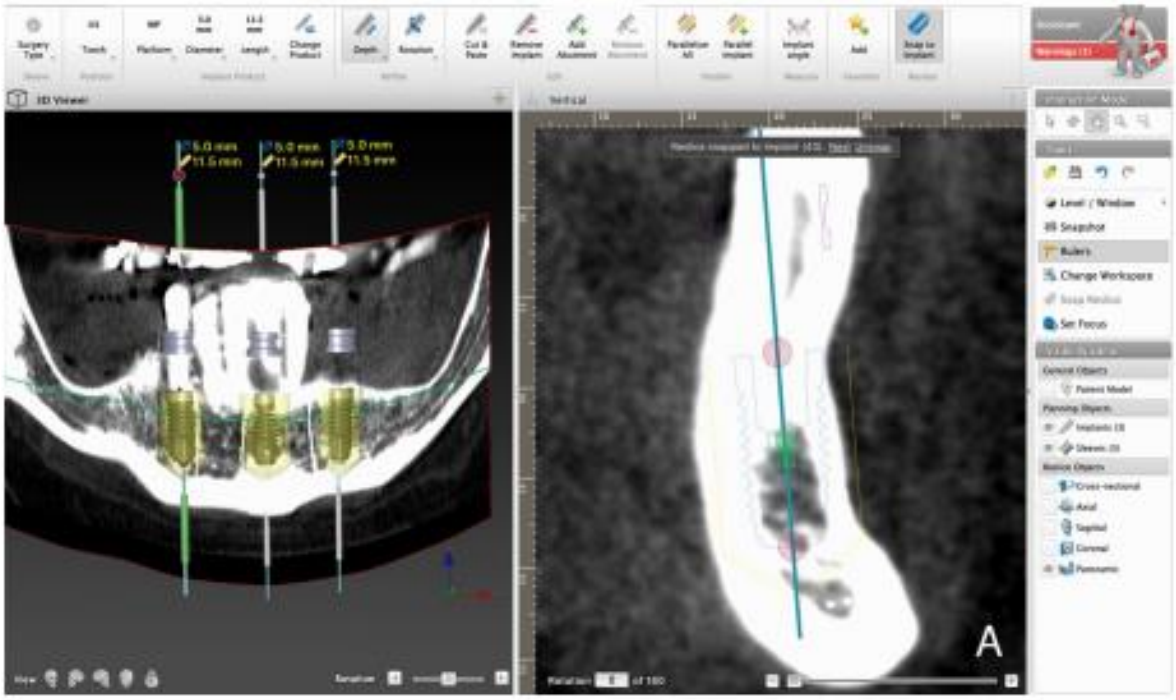
2. X-ray - performed using a dental computed tomograph PLANMECA PROMAX 3D. Her data were used using the DICOM program to assess anatomical and topographic landmarks, the risks of surgical intervention and planning for implant insertion.

X-ray examination was performed before implantation, 6 months after the prosthetics

1. Statistical - carried out using the methods of variation statistics of the Student-Fisher test.

Research results. In the main group (41 patients), 41 complete fixed prostheses were made, supported by 100 implants. Before the operation, plaster models of the jaws were obtained and fixed in an Asa dental articulator using a facial arch. In the dental laboratory, a wax composition with artificial polymer teeth (before the surgical template) was prepared, an individual template-spoon made of transparent plastic for the subsequent impression of the prosthetic bed during the operation with simultaneous registration of the central ratio.

Fig. 1. Planning dental implantation using the DICOM program.



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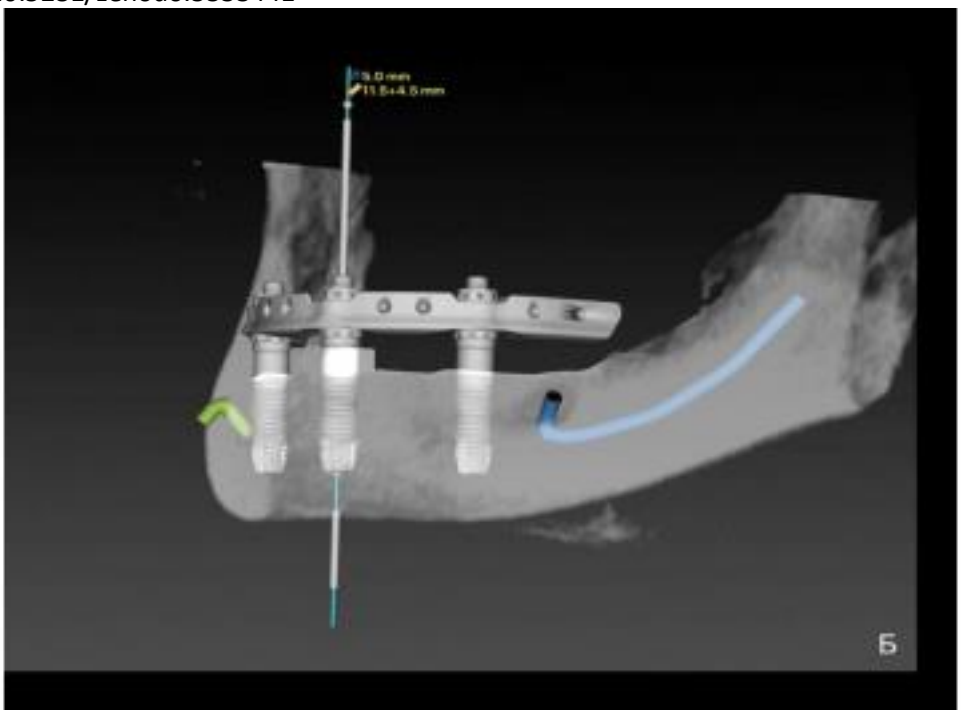

According to the obtained X-ray template, a surgical template was made using the DICOM program (Fig. 2).

Fig. 2. Carrying out an operation using a surgical template

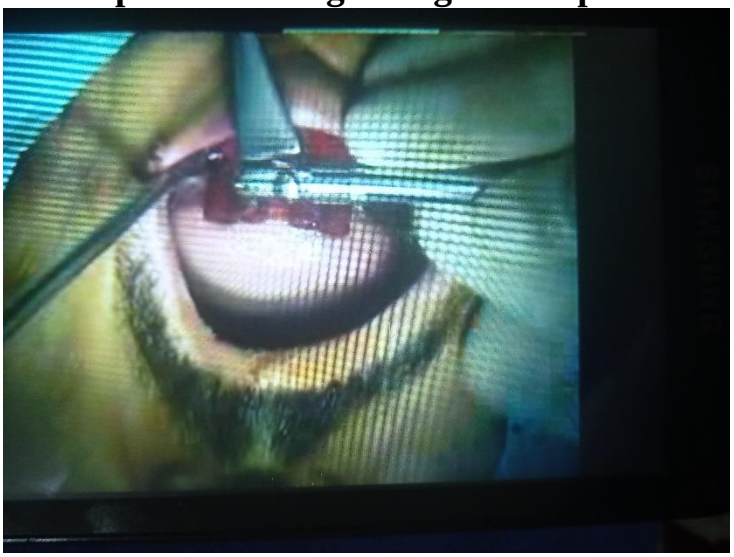

Fig. 3. Template fixed with a screw to the implants

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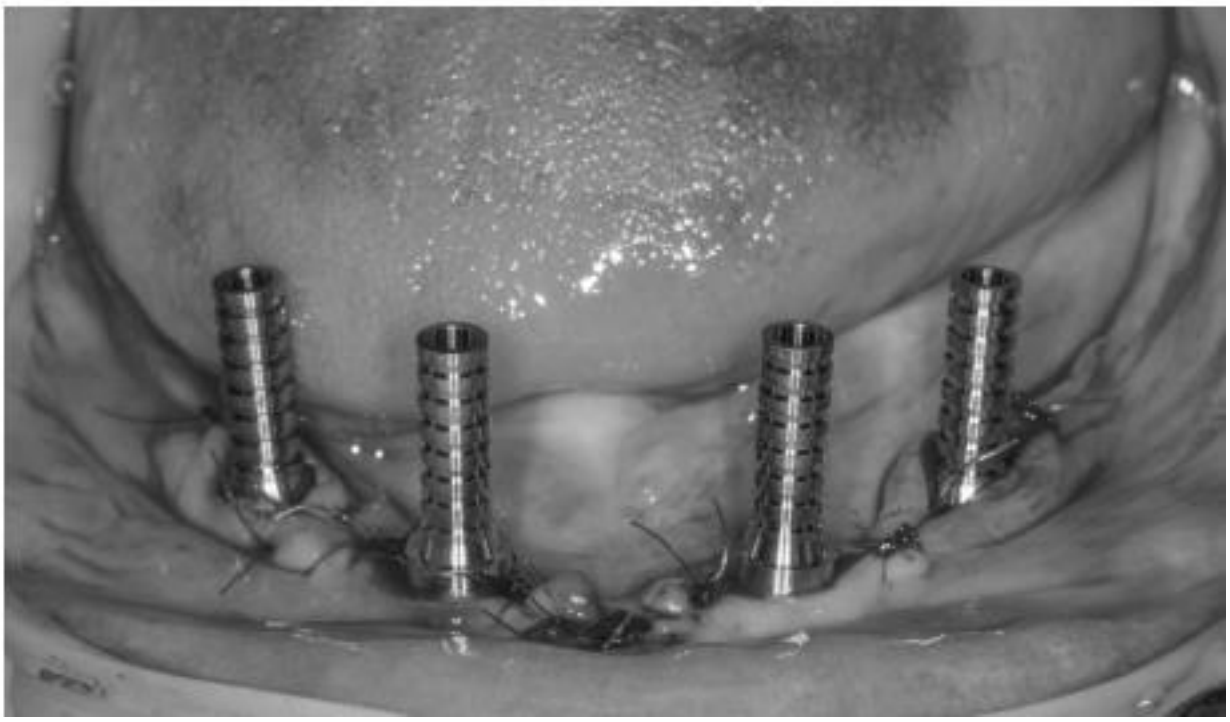
Fig. 3. Template fixed with a screw k During observation (6-18 months) after prosthetics, signs of peri-implant mucositis in the form of hyperemia, edema were observed in the area of 4 out of 100 (4.00%). Such patients were prescribed Traumeel S. During the study of suppuration, the presence of ulcerations, fistulas, pain was not noticed, and complaints of these manifestations were absent, the phenomena of mucositis could be quickly stopped. No cases of peri-implantitis were diagnosed.

Radiographically vertical bone atrophy, i.e. the appearance of peri-implant pockets was not detected. Insignificant horizontal atrophy was observed in 2 implants by the end of 18 months (2.00%) and averaged 0.62 ± 0.13 mm.

In the control group (39 patients), 39 complete removable prostheses were made, supported by 98 implants.

The preliminary prosthesis was fixed on the day of taking the impression using transitional elements - temporary support heads made of titanium alloy, having been carefully previously carefully finished, ground and polished
implants.

Fig. 4. Temporary support heads fixed to implants.



Since these patients did not undergo dental computed tomography using the DICOM program, and the results were assessed only using an orthopantomogram, the patients were prescribed antibiotic therapy for 5-7 days (Ampiox 250 mg, 1 table 3 times a day), NSAIDs (Ketorol Pro) to reduce soft tissue edema. The sutures were removed on day 14 by removing the prosthesis and washing the implant shafts with antiseptic solutions.

During follow-up (6-18 months after prosthetics), signs of peri-implant mucositis in the form of hyperemia and edema were observed in the area of 8 implants (8.10%). At the same time, loosening was determined in 4 of them (4.08%). During the study, no suppuration, the presence of fistulas, or pain was detected. There were no complaints about these manifestations. The phenomena of mucositis could

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Conclusions. The loss of bone tissue in the main group was at the level of 0.54 ± 0.21 mm, while in the control group it was 0.74 ± 0.32 mm. Moreover, foreign studies have shown that in the presence of 3 implants, bone loss ranged from 0.5 ± 0.46 mm to 0.7 ± 0.76 mm. These values are comparable to those obtained by us in the main group.

10.5281/zenodo.5533441

References.

1. A method of quantifying overall satisfaction of complete denture patients / Y. Sato [et al.] // J Oral Rehabil. – 2000. – № 27. – P. 952-957.
2. A new treatment concept for rehabilitation of the edentulons mandible. Preliminary results from a prospective clinical follow-up study / P.-I. Bränemark [et al.] // Clin. Impl. Dentistry and Related Res. – 1999. – Vol. 1, № 1. – P. 2-16.
3. A systematic review and meta analysis of removable and fixed implant supported prostheses in edentulous jaws: Post loading implant loss / J. S. Kern [et al.] // Clin. Oral Implants Res. – 2016. – № 27. – P. 174-195
4. A systematic review of the survival and compliation rates of all-ceramic and metal-ceramic reconstructions after an observation period of the last 3 years. Part I: Single crowns // P. Pjetursson [et al.] // Clin. Oral Implants Res. – 2007. – Vol. 18, № 3. – P. 73-85
5. A systematic review of the survival and complication rates of all-ceramic and metal-ceramic reconstructions after an observation period of at least 3 years. Part II: fixed dental prostheses / B. E. Sailer [et al.] // Clin. Oral Implants Res. – 2007. – № 18(3). – P. 86-96.
6. Allen, P. A patient-based assessment of implant-stabilized and conventional complete dentures / P. Allen, A. McMillan, D. Walshaw // J. Prosth. Dent. – 2001. – Vol. 85, № 2. – P. 141-147.
7. Alsabecha, N. Mandibular single-implant overdentures: a review with surgical and prosthodontic perspectives of a novel approach / N. Alsabecha // Clinical Oral Implants Research. – 2009. – № 20. – P. 357.
8. Bränemark Novum®: A new treatment concept for rehabilitation of the edentulons mandible. Preliminary results from a prospective clinical follow-up study / P.-I. Bränemark [et al.] // Clin. Impl. Dentistry and Related Res. – 1999. – Vol. 1, № 1. – P. 2-16.
9. Chen, S. Esthetic ontcomes following immediate and early implant placement in the anterior maxilla: a systematic review / S. Chen, D. Buser // Int. J Oral Maxillofac. Implants. – 2014. – Vol. 29. – P. 186-215.
10. Consensus statements and clinical recommendations for prevention and management of biologic and technical implant complications / L. Heitz-Mayfield [et al.] // Int. J Oral Maxillofac. Impl. – 2014. – Vol. 29. – № l. – P. 346-350.
11. Critchlow, S. B. Prognostic indicators for conventional complete denture therapy: a review of the literature / S. B. Critchlow, J. S. Ellis // J Dent. – 2010. – № 38. – P. 2-9.
12. De Lima, E. Patients expectation of and satisfaction with implant-supported fixed partial dentures and single crowns / E. De Lima, M. Dos Santos, L. Marchini // Int. J Prosthodont. – 2012. – Vol. 25, № 3. – P. 484-490.
13. Degidi, M. A 10-year follow-up of immediately loaded implants with TiUnite porous anodized surface / M. Degidi, D. Nardi, A. Piattelli // Clin. Implant Dent. Relat Res. – 2012. – Vol. 14. – P. 828-838.

14. Do implant overdentures improve dietary intake? A randomized clinical trial / N. Hamdan [et al.] // J Dent. Res. – 2013. – Vol. 92, № 12. – P. 146-153
15. Does immediate loading affect clinical and patient centered outcomes of mandibular 2 unsplinted implant overdenture? A 2 year within case analysis / E. Emami [et al] // J of Dent. – 2016. – № 50. – P. 30-36.
16. Duvernay, E. Dental appearance and personality trait judgment of elderly persons / E. Duvernay [et al.] // Int. J Prosthodont. – 2014. – Vol. 27, № 4. – P. 348-354.
17. Esposito, M. Agreement of quantitatire subjective evaluation of esthetic changes in implant dentistry by patients and practitiovers / M. Esposito, M. Crusovin, H. Worthington // Int. J Oral. Maxillofac. Implants. – 2009. – Vol. 24. – P. 309-315.
18. Five year study of mandibular overdentures on stud abutments: Clinical outcome, patient satisfaction and prosthetic maintenance – Influence of bone resorption and implant position / C. Matthys [et al.] // Clin. Oral Impl. Res. – 2019. – № 30(9). – P. 940-951.
19. Functional and esthetic comparison of metal-ceramic and all-ceramic posterion three-unit fixed dental prostheses / M. Nicolaisen [et al.] // Int. J Prosthodont. – 2016. – Vol. 29, № 5. – P. 473-481.
20. Gallucci Success criteria in implant dentistry: a systematic review / P. Papaspyridakos [et al.] // J Dent Res. – 2012. – № 91. – P. 242-248.
21. General well-being as an important co-factor of self-assessment of dental appearance / S. Wolfart [et al.] // Int. J Prosthodont. – 2006. – Vol. 19. – P. 449-454.
22. Immediate rehabilitation of the edentulous jaws with full fixed prostheses supported by four implants: interium results of a single cohort perspective study / E. Agliardi [et al.] // Clin Oral Implants Res. – 2010. – Vol. 21. – P. 459-465.
23. Impact of crestal bone resorption on quality of life and professional main tenance with conventional dentures or Locator retained mandibular implant overdentures / C. Matthys [et al.] // J of Pros. Dent. – 2017. – № 120. – P. 886-894.
24. Impact of patient characteristics on edentulous subjects' preferences for prosthodontics rehabilitation with implants / C. R. Leles [et al.] // Clin Oral Implants Res. – 2019. – № 30(3). – P. 285-292.
25. Influence of controlled immediate loading and implant design on peri-implant bone formation / K. Vandamme [et al.] // J Clin. Periodontol. – 2007. – Vol. 34. – P. 172-181.
26. Koldsland, O. Prevalence of peri-implantitis related to severity of the disease with different degrees of bone loss / O. Koldsland, A. Scheie, M. Aass // J Periodontol. – 2010. – Vol. 81. – P. 231-238.
27. Layton, D. Patient-evaluated dentistry: development and validation of a patient satisfaction questionnaire for fixed prosthodontic treatment / D. Layton, T. Walton // Int. J Prosthodont. – 2011. – Vol. 24, № 4. – P. 332-341.
28. Liddelow, G. The immediately loaded single implant-retained mandibular overdenture: A 36-month prospective study / G. Liddelow, P. Henry // Int. J Prosthodont. – 2010. – Vol. 23, № 1. – P. 13-21
29. Longitudinal study of quality of life of elderly with mandibular implant-

supported fixed prostheses / G. Berretin-Felix [et al.] // Clin. Oral Implants Res. – 2008. – Vol. 7. – P. 704-708.
30. Long-term changes in oral health-related quality of life over a period of 5 years in patients treated with narrow diameter implants: A prospective clinical study / D. R. Reissmann [et al.] // J of Dent. – 2018. – Vol. 75. – P. 84-90.
31. Long-term results of mandibular implants supporting and overdenture: implant survival, failures, and crestal bone level changes / T. Ueda [et al.] // Int. J Oral Maxillofac. Implants. – 2011 – Vol. 26. – P. 365-372.
32. Malo, P. Implants placed in immediate function in periodontally compromised sites: a five-year retrosrective and one-year prospective study / P. Malo, M. de Araujo Nobre, B. Rangert // J Prothet. Dent. – 2007. – Vol. 97, № 6. – P. 86-95.
33. Mandibular two-implant overdentures: prosthodontic maintenance using different loading protocols and attachment systems / A. Mackie [et al.] // Int. J Prosthodont. – 2011. – Vol. 24, № 5. – P. 405-416.
34. Maryod, W. H. Immediate versus early loading of mini-implants supporting mandibular overdentures: a preliminary 3-year clinical outcome report / W. H. Maryod, S. M. Ali, A. F. Shawky // Int. J Prosthodont. – 2014. – Vol. 27, № 6. – P. 553-560.
35. Mericske-Stern, R. Optimal number of oral implants for fixed reconstructions: A review of the literature / R. Mericske-Stern, A. Worni // Eur. J Oral Implantol. – 2014. – Vol. 7, № 2. – P. 133-153.
36. Mombelly, A. The diagnosis and treatment of peri-implantitis / A. Mombelli, N. Lang // Periodontol. – 2000. – Vol. 17. – P. 63-76.
37. Nogueira, T. E. Changes in masticatory performance of edentulous patients treated with single-implant mandibular overdentures and conventional complete dentures / T. E. Nogueira, M. Schimmel, C. R. Leles // J Oral Rehabil. – 2019. – № 46(3). – P. 268-273
38. Patient Eligibility for Standardized Treatment of the Edentulous Mandible: A Retrospective CBCT-Based Assessment of Mandibular Morphology / W. Aouini [et.al.] // J Clin. Med. – 2019. – № 8(5). – P. 616.
39. Patient satisfaction versus retention of implant overdentures with two attachment systems: A randomized trial / R. F. de Albuquerque [et al.] // Clin. Implant Dent. Relat. Res. – 2018. – № 21. – P. 21-31.
40. Patient-reported outcome measures of edentulous patients restored with implant-supported removable and fixed prostheses: A systematic review / C. J. Yao [et. al.] // Clin. Oral Implants Res. – 2018. – № 29(16). – P. 241-254.