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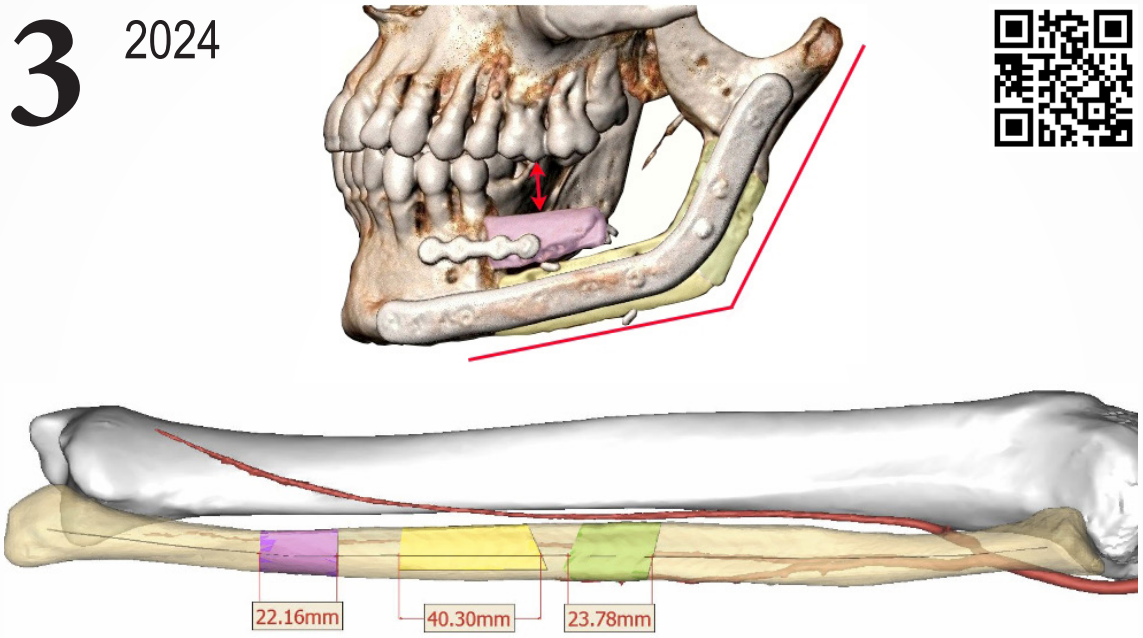
Journal of Diagnostics and Treatment of Oral and Maxillofacial Pathology

3 2024



The cover images indicate the key direction of the journal and highlight an article titled "The 'Beveled One-and-a-Half-Barrel' Fibula Transplant with Virtual Surgical Planning and CT-Guided Implant Surgery for Prosthetic Rehabilitation in Posterior Mandible Defects: A Pictorial Essay" by Olindo MASSARELLI and Silvio Mario MELONI. The article was published in Volume 6, Issue 3.

This is a monthly open access and peer-reviewed journal for oral and maxillofacial surgeons. The journal made the transition from a print and an online version to an online-only version on January 1, 2022.

TANTUM VERDE®

QUICK RELIEF FROM PAIN AND INFLAMMATION IN THE MOUTH AND THROAT[1]

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- **JAWS FRACTURES[3]**
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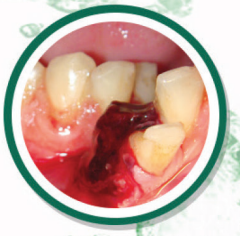
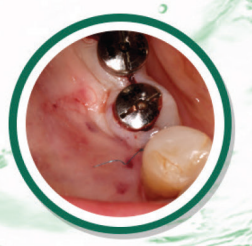
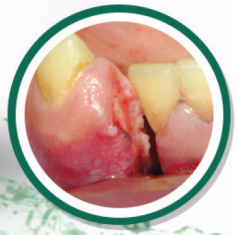
- **WOUNDS OF ORAL CAVITY[5]**







Reg. № UA/3920/01/01

LOCAL ANESTHETIC AND ANTI-INFLAMMATORY EFFECT[1]

SUMMARY OF PRODUCT CHARACTERISTICS

NAME OF THE MEDICINAL PRODUCT. Tantum Verde 0.15% mouthwash. QUALITATIVE AND QUANTITATIVE COMPOSITION. Each 100 ml contains: active ingredient: benzydamine hydrochloride 0.15 g (equivalent to 0.134 g of benzydamine). **Therapeutic indications.** Treatment of symptoms such as irritation/inflammation including those associated with pain in the oropharyngeal cavity (e.g. gingivitis, stomatitis and pharyngitis), including those resulting from conservative or extractive dental therapy. **Posology and method of administration.** Pour 15 ml of Tantum Verde mouthwash into the measuring cup, 2-3 times per day, using it either at full concentration or diluted. If diluted, add 15 ml of water to the graduated cup. Do not exceed the recommended dosage. **Contraindications.** Hypersensitivity to benzydamine or to any of the excipient. **PHARMACOLOGICAL PROPERTIES. Pharmacodynamic properties.** Pharmacotherapeutic group: Stomatologic drugs: other agents for local oral treatment, ATC code: A01AD02. Clinical studies demonstrate that benzydamine is effective in relieving suffering from localised irritation of the mouth and pharynx. In addition, benzydamine possesses a moderate local anaesthetic effect. **Pharmacokinetic properties.** Absorption. Absorption through the oropharyngeal mucosa is demonstrated by the presence of measurable quantities of benzydamine in human plasma. These levels are insufficient to produce systemic effects. Distribution. When applied locally, benzydamine has been shown to accumulate in inflamed tissues where it reaches effective concentrations because of its capacity to penetrate the epithelial lining.

Information about medicines. Information for health care professionals for use in professional activities.

1. Інструкція для медичного застосування лікарського засобу Тантум Верде®, розчин для ротової порожнини, РП № UA/3920/01/01, затверджено Наказом Міністерства охорони здоров'я України № 636 від 01.10.2015.
2. http://www.angelinipharma.com/wps/wcm/connect/com/home/Angelini+Pharma+in+the+world/
3. Тимофеев А.А. и др. "Особенности гигиены полости рта для профилактики воспалительных осложнений при переломах нижней челюсти". Современная стоматология 2015;1(75):52–8.
4. 4,5. Tymofieiev O.O. et al"Prevention of inflammatory complications upon surgeries in maxillofacial region". J Diagn Treat Oral Maxillofac Pathol. 2017;1:105–12.

Clinical and CT images are courtesy of: Ievgen Fesenko (Department of Oral & Maxillofacial Surgery, PHEI "Kyiv Medical University", Kyiv, Ukraine), Oleg Mastakov ("SCIEDECE—Scientific Center of Dentistry & Ultrasound Surgery" Kyiv, Ukraine)

ANGELINI

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Dileo FARMA

About the Journal

MARCH 2024 • VOLUME 8 • ISSUE 3
www.dtjournal.org

Official Title

Journal of Diagnostics and Treatment of Oral and Maxillofacial Pathology

Official Title in Ukrainian

Журнал діагностики та лікування оральної і щелепно-лицевої патології

Standard Abbreviation: ISO 4

J. Diagn. Treat. Oral Maxillofac. Pathol.

Acronym

JDTOMP

International Standard Serial Number (ISSN)

ISSN 2522-1965 (online)

Aims & Scope

This is a monthly open access and peer-reviewed oral and maxillofacial surgeons. The journal is focused on trauma, microvascular and jaw reconstructive surgery, dental implants, salivary gland tumors/diseases, TMJ lesions, virtual surgical planning, implementation of ultrasonography into the practice of oral and maxillofacial surgeons.

Editorial Board (EB) Composition

- EB shows significant geographic diversity representing 34 opinion leaders from 14 countries: Brazil, Canada, Colombia, Greece, Hong Kong (SAR, China), India, Israel, Italy, Slovak Republic, Spain, Ukraine, United Arab Emirates, United Kingdom, and United States.
- The majority of the EB Members have a discernible publication history in Scopus, Web of Science, and journals with a high impact factor.
- The publication records of all EB members are consistent with the stated scope and published content of the journal.
- The journal has several full-time professional editors.
- Gender distribution of the editors: 11.76% women (4 persons), 88.24% men (30 persons), 0% non-binary/other, and 0% prefer not to disclose.

Frequency

12 issues a year (from January 2020)

Publication History

2017: 4 issues a year
2018: 4 issues a year
2019: 10 issues a year
From 2020: 12 issues a year

Publishing Model

The *Journal of Diagnostics and Treatment of Oral and Maxillofacial Pathology* is a fully online-only open access and peer-reviewed publication.

Types of Peer Review

The journal employs "double blind" and open reviewing.

Article Publishing Charge (APC)

The APC in this journal is 500 Euro ($550 USD) and 250 Euro ($275 USD)(excluding taxes) depending on the article`s type. Details at website: www.dtjournal.org.

Types of Articles Currently Published by the Journal

Editorials/Guest Editorials/Post Scriptum Editorials, Images, Case Reports/Case Series, Original Articles, Review Articles, Discussions, Paper Scans (*synonyms*: Review of Articles, Literature Scan), Book Scans (*synonym*: Book Reviews), Letters to the Editor (*synonym*: Letters), and Viewpoints.

State Registration in Ministry of Justice of Ukraine

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Re-registration: May 21, 2019 (Certificate: КВ № 23999-13839 ПР)
Re-registration: Aug 10, 2021 (Certificate: КВ № 24951-14891 ПР).

Journal is Included in

Encyclopedia of Modern Ukraine, Google Scholar, National Repository of Academic Texts, Register of Scientific Publications of Ukraine (also known as Ukrainian Scientific Periodicals or Register of Scientific Professional Publications of Ukraine), ResearchGate, Scilit, and Vernadsky National Library of Ukraine

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2. Private Higher Educational Establishment "Kyiv Medical University."
3. OMF Publishing, Limited Liability Company.

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Ukrainian Association for Maxillofacial and Oral Surgeons

Ukrainian Association for Maxillofacial and Oral Surgeons (UAMOS)

Address: 4-A Profesora Pidvysotskoho Street, Kyiv 01103, Ukraine.
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Website: www.uamos.org.

Editorial Board

MARCH 2024 • VOLUME 8 • ISSUE 3
www.dtjournal.org

TANTUM VERDE®

INFORMATION LEAFLET
for the medicinal product

Composition:
active substance: **benzydamine hydrochloride**;
100 mL of solution contain benzydamine hydrochloride 0.15 g;
excipients: ethanol 96%, glycerol, methyl parahydroxybenzoate (E 218), flavor (menthol), saccharin, sodium hydrocarbonate, Polysorbate 20, Quinoline Yellow (E 104), Patent Blue V (E 131), purified water.

Dosage form. Oromucosal solution.
Basic physical and chemical properties: a clear green liquid with a typical mint flavor.

Pharmacotherapeutic group. Dental preparations. Other agents for local oral treatment.
ATC code: A01A D02.

Pharmacological properties.
Pharmacodynamics.
Benzydamine is a non-steroidal anti-inflammatory drug (NSAID) with analgesic and antiexudative properties.

Clinical studies have shown that benzydamine is effective in the relief of symptoms accompanying localized irritation conditions of the oral cavity and pharynx. Moreover, benzydamine has anti-inflammatory and local analgesic properties, and also exerts a local anesthetic effect on the oral mucosa.

Pharmacokinetics.
Absorption through the oral and pharyngeal mucosa has been proven by the presence of measurable quantities of benzydamine in human plasma. However, they are insufficient to produce any systemic pharmacological effect. The excretion occurs mainly in urine, mostly as inactive metabolites or conjugated compounds.

When applied locally, benzydamine has been shown to cumulate in inflamed tissues in an effective concentration due to its ability to permeate through the mucous membrane.

Clinical particulars.
Indications.
Symptomatic treatment of oropharyngeal irritation and inflammation; to relieve pain caused by gingivitis, stomatitis, pharyngitis; in dentistry after tooth extraction or as a preventive measure.
Contraindications.
Hypersensitivity to the active substance or to any other ingredients of the product.

Interaction with other medicinal products and other types of interaction.
No drug interaction studies have been performed.

Warnings and precautions.
If sensitivity develops with long-term use, the treatment should be discontinued and a doctor should be consulted to get appropriate treatment.

In some patients, buccal/pharyngeal ulceration may be caused by severe pathological processes. Therefore, the patients, whose symptoms worsen or do not improve within 3 days or who appear feverish or develop other symptoms, should seek advice of a physician or a dentist, as appropriate.

Benzydamine is not recommended for use in patients hypersensitive to acetylsalicylic acid or other non-steroidal anti-inflammatory drugs (NSAIDs).

The product can trigger bronchospasm in patients suffering from or with a history of asthma. Such patients should be warned of this.

For athletes: the use of medicinal products containing ethyl alcohol might result in positive antidoping tests considering the limits established by some sports federations.

Use during pregnancy or breast-feeding
No adequate data are currently available on the use of benzydamine in pregnant and breastfeeding women. Excretion of the product into breast milk has not been studied. The findings of animal studies are insufficient to make any conclusions about the effects of this product during pregnancy and lactation.

The potential risk for humans is unknown.

TANTUM VERDE should not be used during pregnancy or breast-feeding.

Effects on reaction time when driving or using machines
When used in recommended doses, the product does not produce any effect on the ability to drive and operate machinery.

Method of administration and doses.
Pour 15 mL of TANTUM VERDE solution from the bottle into the measuring cup and gargle with undiluted or diluted product (15 mL of the measured solution can be diluted with 15 mL of water). Gargle 2 or 3 times daily. Do not exceed the recommended dose.

Children.
The product should not be used in children under 12 years due to a possibility of ingestion of the solution when gargling.

Overdosage.
No overdose has been reported with benzydamine when used locally. However, it is known that benzydamine, when ingested in high doses (hundreds times higher than those possible with this dosage form), especially in children, can cause agitation, convulsions, tremor, nausea, increased sweating, ataxia, and vomiting. Such acute overdose requires immediate gastric lavage, treatment of fluid/salt imbalance, symptomatic treatment, and adequate hydration.

Adverse reactions.
Within each frequency group, the undesirable effects are presented in order of their decreasing seriousness.

Adverse reactions are classified according to their frequency: very common (≥ 1/10); common (≥ 1/100 to <1/10); uncommon (≥ 1/1,000 to <1/100); rare (≥ 1/10,000 to <1/1,000); very rare (<1/10,000); frequency unknown (cannot be estimated from the available data).

Gastrointestinal disorders: rare – burning mouth, dry mouth; *unknown* – oral hypesthesia, nausea, vomiting, tongue edema and discoloration, dysgeusia.

Immune system disorders: rare – hypersensitivity reaction, *unknown* - anaphylactic reaction.

Respiratory, thoracic and mediastinal disorders: very rare –laryngospasm; *unknown* – bronchospasm.

Skin and subcutaneous tissue disorders: uncommon – photosensitivity; *very rare* – angioedema; *unknown* – rash, pruritus, urticaria.

Nervous system disorders: unknown – dizziness, headache.

TANTUM VERDE contains methyl parahydroxybenzoate, which can cause allergic reactions (including delayed-type reactions).

Shelf life. 4 years.

Storage conditions.
Do not store above 25°C. Keep out of reach of children.

Packaging.
120 mL of solution in a bottle with a measuring cup; 1 bottle per cardboard box.

Dispensing category.
Over-the-counter medicinal product.

Manufacturer.
Aziende Chimiche Riunite Angelini Francesco A.C.R.A.F. S.p.A., Italy.

Location of the manufacturer and its business address. Via Vecchia del Pinocchio, 22 – 60100 Ancona (AN), Italy.

Date of the last revision of the text.
September 26, 2018.

Information leaflet is

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Order of the

Ministry of Health of Ukraine
No. 636 dated 01.10.2015

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Міністерство юстиції України

Свідоцтво

про державну реєстрацію друкованого засобу масової інформації

Серія КВ № 24951-14891ПР

«Журнал діагностики та лікування оральної і щелепно-лицевої патології»
(назва видання державною мовою)

«Journal of Diagnostics and Treatment of Oral and Maxillofacial Pathology»
(назва видання іншою мовою (мовами))

Вид видання журнал
(газета, журнал, бюлетень, збірник, альманах, календар, дайджест)

Статус видання вітчизняне
(вітчизняне, спільне)

Мова (мови) видання змішаними мовами: українська, англійська

Вид видання за цільовим призначенням наукове, науково-виробниче
(громадсько-політичне, наукове, навчальне, інформаційне, рекламне (понад 40 відсотків обсягу одного номера – реклама), еротичне тощо)

Обсяг, періодичність 23,1 ум. друк. арк., формат А4 (210х297мм), 1 раз на місяць

Сфера розповсюдження та категорія читачів загальнодержавна, зарубіжна
лікарі-стоматологи-хірурги; лікарі ультразвукової діагностики, лікарі-рентгенологи, лікарі-патологоанатоми, студенти, лікарі-інтерни, слухачі, аспіранти, докторанти, наукові, науково-педагогічні та педагогічні працівники закладів вищої освіти та наукових установ

Засновник (співзасновники) Національний університет охорони здоров'я України імені П.Л. Шупика (код за ЄДРПОУ 01896702), Приватний вищий навчальний заклад «Київський медичний університет» (код за ЄДРПОУ 16478809), Товариство з обмеженою відповідальністю «ОМФ ПАБЛІШИНГ» (код за ЄДРПОУ 40493077)

Програмні цілі (основні принципи) або тематична спрямованість журнал присвячений сучасним проблемам діагностики і лікування в хірургічній стоматології та щелепно-лицевій хірургії

Перший заступник Міністра Євгеній ГОРОВЕЦЬ

10.08.2021
(дата реєстрації)

FIGURE. Certificate of State Re-Registration of the Print Mass Media (journal) in the Ministry of Justice of Ukraine as of 2021. The *Journal* was registered for the first time in 2016 under the title *Diagnostics and Treatment of Oral and Maxillofacial Pathology*. The next re-registration took place in 2019.

Content

of the Volume 8 • Issue 3 • March 2024

COURTESY

The *Journal*`s cover images are courtesy Olindo Massarelli, MD, PhD, FEBOMFS.

The images were taken from this article: Massarelli O, Meloni SM. The "beveled one-and-a-half-barrel" fibula transplant with virtual surgical planning and CT-guided implant surgery for prosthetic rehabilitation in posterior mandible defects: a pictorial essay. *J Diagn Treat Oral Maxillofac Pathol* **2022**;6(3):39–59.

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CASE REPORT/TECHNIQUE

Partially Edentulous Arches and Bilateral Mandibular Fracture: Application of Condensation-Silicone Bite Block-Splint, Mandibulo-Maxillary Fixation Screws, and Elastics for Intraoral Immobilization

Ievgen I. Fesenko[a,*], Vasyl A. Rybak[b], & Oleg Y. Mastakov[c]

SUMMARY

Each mandibular fracture is unique. It requires individual treatment solutions due to different number of fracture sites, fracture terms, level of dislocation, presence/absence of the infection, number, location, and condition of teeth, etc. Management of jaw fractures in partially edentulous arches are even more complicated and typically can involve assistance of a dental technician. Published English language literature lacks information about application of condensation silicone (C-silicone) bite block-splint with mandibulo-maxillary fixation (MMF) screws and elastics for management of bilateral mandibular fracture. This is why we present this novel technique developed by our team based on fracture treatment in a 38-year-old male partially edentulous patient. Also, we introduce a Kyiv's Modification of the Kennedy Classification System of the partially edentulous arches useful for mandible fracture cases. The Kennedy–Kyiv Classification System

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Article type: Case report/technique.

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The word 'splint' at the upper right icon means that article contains description of how to fabricate and apply the c-silicone bite block-splint in combination with mandibulo-maxillary fixation screws and elastics.

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considers the non-treated teeth roots as supporting locking points (temporary additional retention points) that increase the stability of the bite block-splint and decrease probability of micromovements. Moreover, it contraindicates extracting such teeth roots immediately before the block-splint fixation as extraction of such roots can provoke the alveolar osteitis upon the fracture site(s) healing and immobilization period what will increase the risk of the block removal for the treatment of osteitis. A review of published MMF techniques and appliances designed for mandible fracture treatment is performed. Multiple appliances for partially and totally edentulous mandibles are considered as well as for the dentulous jaws. The Gunning-type splints and its modifications were considered. An in-chair fabrication of C-silicone bite block-splint and its combined application with MMF screws and elastics is a novel alternative for the Gunning splint. This appliance allows to decrease the time typically required for the Gunning splints fabrication, decreases number of the involved specialists, decreases cost of treatment, and easy for performance.

KEY WORDS

Condensation silicone (C-silicone), C-silicone bite block-splint, mandibulo-maxillary fixation (MMF) screws, osteosynthesis, Gunning splint, intermaxillary silicone block, supporting locking points, temporary additional retention points

INTRODUCTION

Condensation silicone (C-silicone) impression materials are widely used by dentists for different types of dental purposes (Khan and colleagues, 2020).[1] Nevertheless, there are no data in the literature on the use of one of these two impression materials for the fabrication of the *bite block-splint* that would serve in combination with mandibulo-maxillary fixation (MMF) screws and elastics to immobilize the partially edentulous fractured mandible. In essence, such C-silicone monoblock can be named as a novel modification of the splint developed by Thomas Brian Gunnning (1868) and which is more known as Gunning splint.[2] It was described as vulcanite splint enclosing the maxillary teeth in addition to fitting the teeth of the mandible (Fraser-Moodie, 1969).[3] Gunning splint is used for intermaxillary fixation of the mandible in partially or totally edentulous mandible cases.

Multiple modifications of the Gunning splint are reported. Shah and colleagues (2018) highlighted modified Gunning splint for the partially edentulous mandible.[4] Sharma and colleagues (2020) published detailed modern description of the Gunning splint with embedded Erich's arch bars for the edentulous mandibles.[5] Chaudhary and colleagues (2014) applied MMF screws in combination with Gunning splint and Erich's arch bars in partially edentulous scenario.[6] Authors made intraosseous insertion of the screws through the Gunning splint.[6]

In this article, we describe a novel technique we applied to several patients with partially edentulous arches upon the mandibular fractures. The paper documents and illustrates one of these cases. We demonstrate a combination of the open reduction internal fixation and conservative treatment of bilateral mandible fracture in partially edentulous patient with nonexistent occlusion. To our knowledge, it is a first report of combined application of intermaxillary C-silicone bite block-splint, MMF screws, and elastics for intraoral immobilization.

CASE REPORT AND TECHNIQUE

In September 2012, a 38-year-old male patient was referred to the Department of Maxillofacial Surgery, Kyiv Regional Clinical Hospital with a history of a mandible pain and limited mouth opening (Fig 1) after the facial trauma happened several days ago.

A conventional panoramic radiography (Fig 2) and radiography in anterior-posterior view showed bilateral mandible fracture. The fracture of the left mandibular body without dislocation and fracture of the right mandibular angle with dislocation were noted. Also, the fractured parts of the lower right third molar (i.e., tooth no. 48) were visualized on x-ray.

The bilateral fracture in this case belongs to Kazanjian and Converse Class II, when teeth are present only on one side of the fracture line (Passi and colleagues, 2017).[8] The patient had partially edentulous arches and missing occlusion (Fig 3).

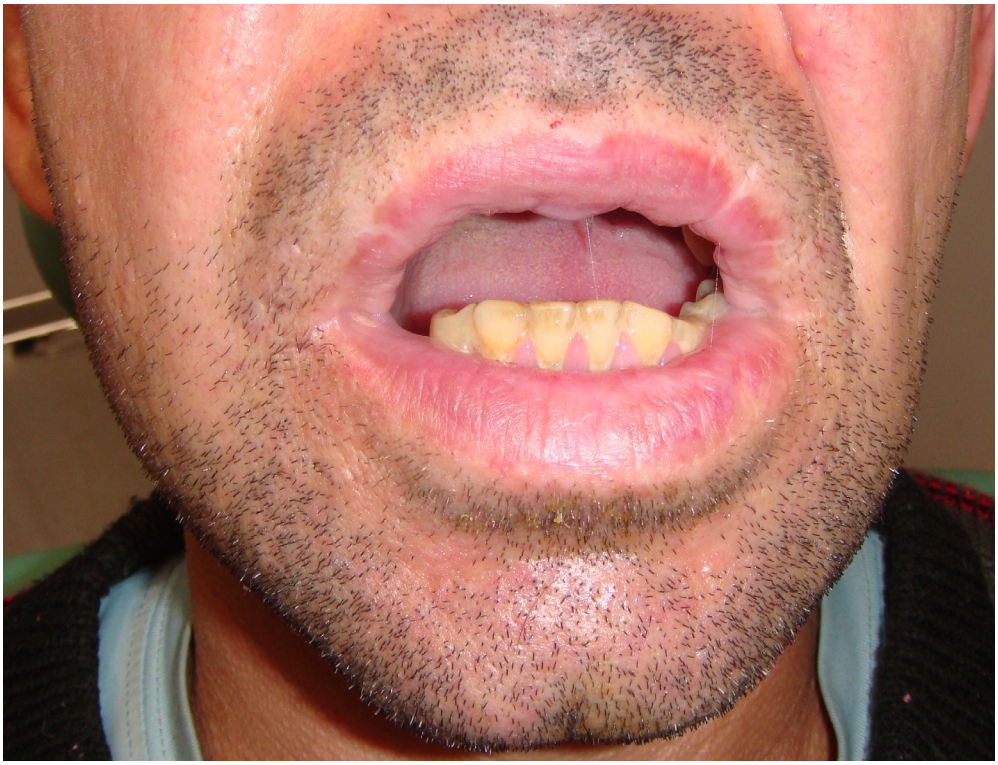

FIGURE 1. Maximum mouth opening.

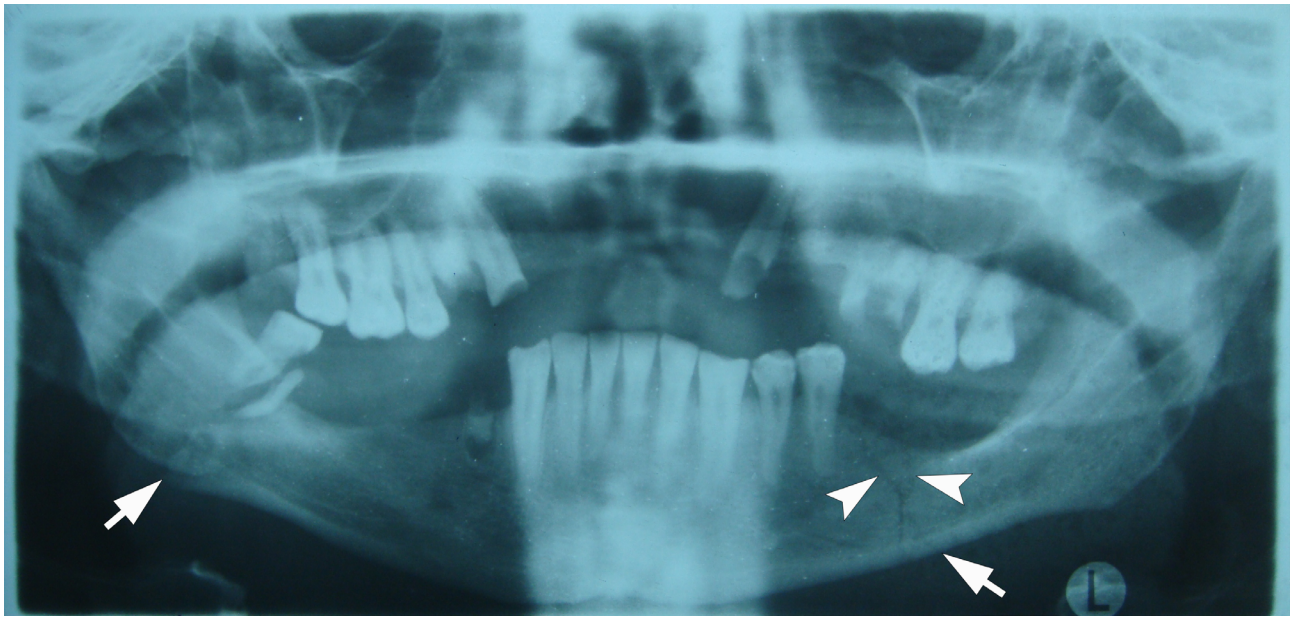

FIGURE 2. Panoramic radiography shows bilateral mandible fracture (*arrows*) in a 38-year-old male. Notes fracture of the left mandibular body without dislocation and fracture of the right mandibular angle with dislocation. Also, notes the fractured parts of the lower right third molar. Radiological sign of duplication is indicated by *arrowheads*.[7] L, left side. Printed with permission and copyrights retained by I.I.F.

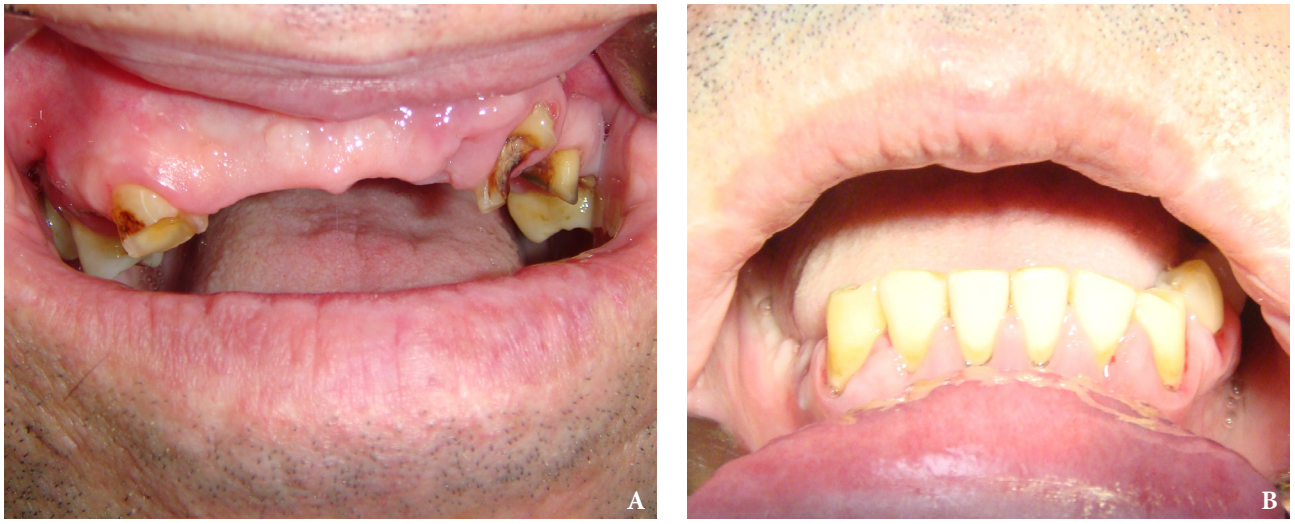

FIGURE 3. Pretreatment intraoral view of the upper (**A**) and lower (**B**) jaw. The roots of the teeth no. 1.5, 1.4, 2.3, and 4.4 act in this situation as *additional temporary anti-rotation points of fixation* for the intermaxillary C-silicone bite block-splint. Printed with permission and copyrights retained by I.I.F.

So, according to FLOATIS classification of mandibular fracture, nonexistent occlusion (O0) was established.[8] Also, it was established Kennedy Class IV (or Kennedy-Kyiv Class IV) on the upper jaw and Kennedy Class I (or Kennedy-Kyiv Class I) on the lower jaw (Şakar, 2016).[9] Upon the establishment classes of the partially edentulous jaws, we proposed a Kyiv's Modification of the Kennedy Classification System of the partially edentulous arches (Kennedy–Kyiv Classification System). According to the rules which have been provided by Applegate to govern application of the Kennedy classification (Şakar, 2016),[9] the classification should follow rather than precede extraction (classification is identified after extraction[s]). Nevertheless, the roots of the teeth are considered in the Kennedy–Kyiv Classification, because (1) they are *supporting locking points* (i.e., *temporary additional retention points*) that increase the stability of the intermaxillary silicone bite block-splint described below and (2) extraction of such roots can provoke the alveolar osteitis upon the fracture site(s) healing and immobilization period what will increase the risk of the block removal for the treatment of osteitis.

It was decided to remove the tooth fragments in the fracture gap, to perform open reduction internal fixation of the right mandible, insertion of MMF screws for intraoral immobilization, and to produce a silicone bite block-splint to make intermaxillary fixation possible. Antibiotic therapy was started immediately after the diagnosis and lasted for 7 days.

The surgery was done by I.I.F. and V.A.R. under the general anesthesia. First, parts of the lower right third molar were removed according to the indications.[9] Secondly, open reduction of the mandible fragments and Y-shape titanium mini-plate fixation were performed (Fig 4). And as a last stage, four self-tapping MMF screws were inserted in the safe zones (Cornelius and Ehrenfeld, 2010)[11] after drilling holes throughout just the outer cortex of the jaws. Osteosynthesis was not performed in the area of the mandible body on the left, due to the fact that the fracture in this area was without dislocation and to avoid impaired vascularization.

The next day after the operation, the bite block was made in the dental chair by I.I.F. and after consulting the prosthodontist (O.Y.M.) and providing the necessary impression materials. C-silicone impression material set was used for the bite block-splint production. The set included the base mass (Speedex putty soft, 1000 g, Coltene/Whaledent AG, Altstätten, Switzerland), universal activator (Speedex Universal Activator, 60 mL, Coltene/Whaledent AG, Altstätten, Switzerland), and corrective mass (Speedex Light Body, 140 mL, Coltene/Whaledent AG, Altstätten, Switzerland).

Stages of the C-silicone bite block-splint fabrication using two-layer technique:

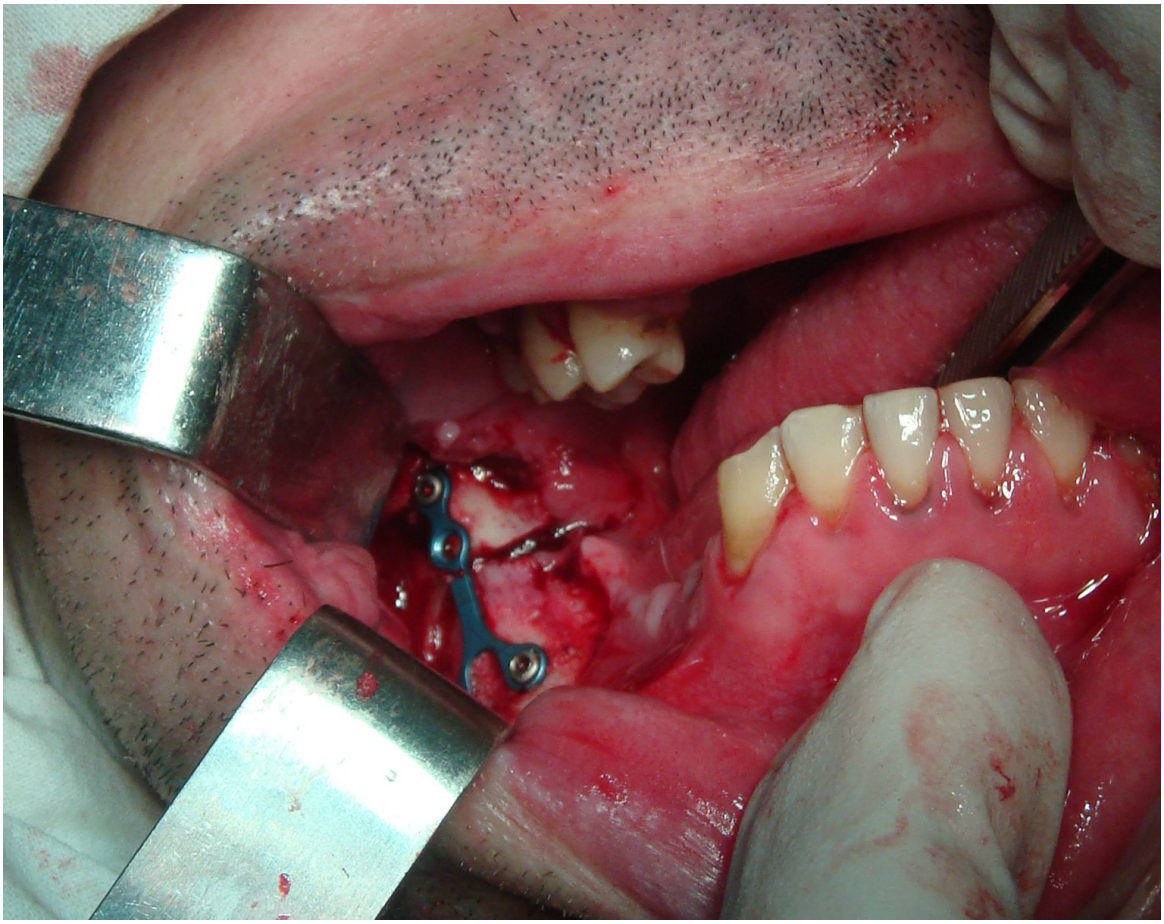

FIGURE 4. Intraoperative view after the extraction of the fragments of the lower right third molar and open reduction of the mandible fragments and Y-shaped titanium mini-plate fixation. Printed with permission and copyrights retained by I.I.F.

1. Base mass was taken in the volume necessary to cover the alveolar processes, teeth, and teeth roots in the anterior area (with some excess for the possibility of cutting with a scalpel blade), allowing the lateral areas to be used for the intake of liquid/ground food via drinking straws.
2. Base material is mixed with an universal activator and a roller is made, which is introduced in an arc between the upper and lower alveolar processes, teeth and existing teeth roots. Next, the doctor had to use his fingers to plaster the outer surfaces of the teeth with silicone (until it had hardened) (that is, to somewhat simulate the vestibular surface with his own hands). We were guided by prosthodontic protocols for determining non-fixed bite height.
3. After hardening, the bite block-splint is removed from the oral cavity.
4. Volume surpluses and edges of the bite block are trimmed, smoothed (using surgical blade no. 10) and grooves are created in the places where the elastics pass.
5. After correction-adaptation of the block to the relief of surrounding tissues and direction/position of the elastics, the corrective mass is mixed with an universal activator, introduced bilaterally into the block-splint, inserted into the oral cavity and the patient was asked to bite.
6. Two elastics were worn immediately after insertion of the splint (Fig 5).

It is worth noting that the attending doctor (I.I.F.) initially tried to make the block-splint similar to the Port and Gunning splint in the matter of creating an opening in the anterior part of the splint. In this case, it is a through round hole. But the created hole was larger than 1 cm what significantly weakened the rigidity of the splint structure and made it weak, which is why the splint had to be refabricated. Therefore, they refused to create a hole at that

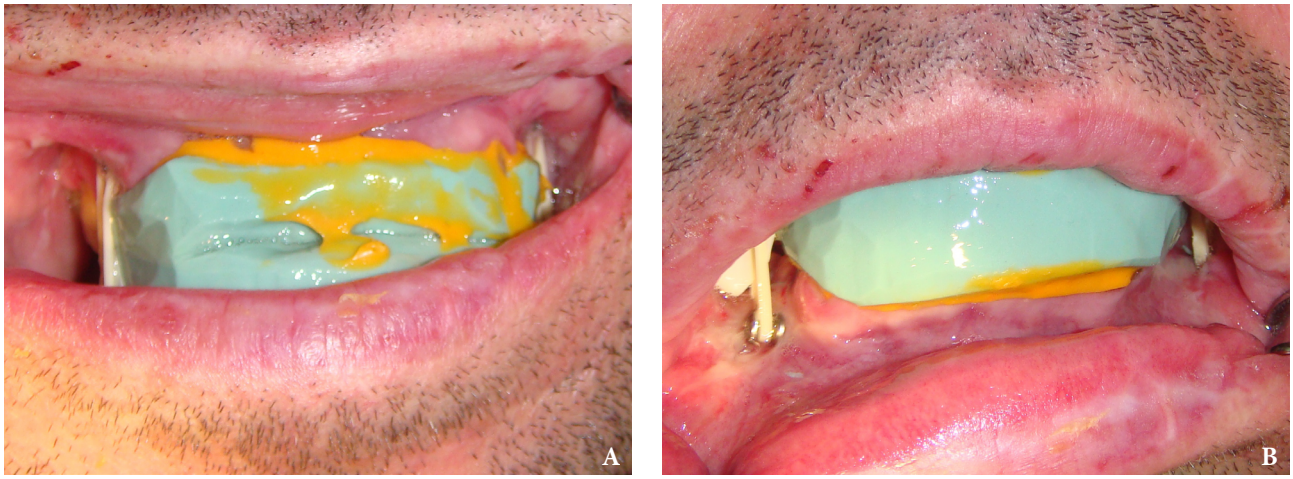

FIGURE 5. Intraoral view of the maxilla (**A**) and mandible (**B**) on postoperative day one. Notes presence of silicone bite block-splint, four mandibulomaxillary fixation screws, and two intermaxilary elastics. Printed with permission and copyrights retained by I.I.F.

moment. Also, excessively reducing the volume (external contours) of the block-splint led to the loss of its necessary stabilizing function, and such an excessively reduced volume of the block-splint also had to be refabricated. In total, two block-splints were not properly trimmed, and the third already met most of the requirements. It was used for treatment.

Perhaps it is most expedient to use a bone harvesting trephine of the appropriate diameter (~7/8 mm) to create a hole. At the same time, in our opinion, it is better not to make the diameter of the hole more than 8/9 mm, as this can significantly weaken the structure of the block-splint. However, the 7/8 mm opening is sufficient for a feeding tube to pass through and to receive liquid/ground food and liquids.

The roots of teeth no. 1.5, 1.4, 2.3, and 4.4 were not removed (1) to use them as retention (support) points for the silicone block and (2) to avoid a possible complication in the form of a dry socket, the treatment of which would require removal of the block at the stage of fracture healing. Such tooth roots as the roots of teeth 1.5, 1.4, 2.3, and 4.4 can be named as *temporary additional retention points*.

Comparison of the pretreatment view and anterior view on postoperative day one is presented in Figure 6.

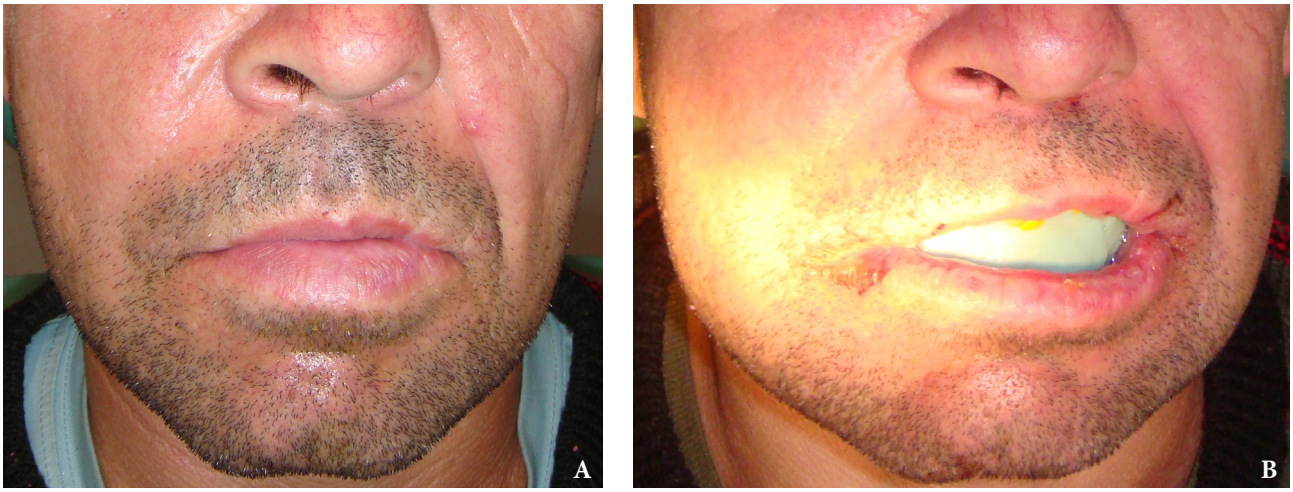

FIGURE 6. Comparison of the pretreatment anterior view (**A**) and anterior view on postoperative day one (**B**). Printed with permission and copyrights retained by I.I.F.

Intermaxillary elastics were temporarily worn during the block fabrication. And immediately after its fabrication and application of the indurent gel, elastics were worn for 3 weeks. They were replaced every 7 days. Elastics were made from a Foley catheter by cutting it crosswise. On the 21st day from the moment of permanent fixation of the elastics, the elastics, block, and screws in which the mobility began to appear were removed. Healing of fracture sites was smooth, and no complaints were reported from the patient's side.

Describing proposed intermaxillary silicone appliance we use the term *bite block-splint* because with closed jaws, temporary additional retention points and equators of existing teeth create a lock splint effect and opening the jaws even without rubber pulls is difficult for the patient.

Combined use of intermaxillary C-silicone bite block-splint and four MMF screws with intermaxillary rubber pulls provided adequate stabilization. Such technique can be applied in partially edentulous mandible fracture cases: (1) after the open reduction internal fixation of dislocated fracture, (2) for the conservative treatment of fracture without dislocation, and (3) in bilateral fractures and combination of open reduction internal fixation of dislocated fracture and conservative treatment of fracture without dislocation (like in the presented case).

DISCUSSION

Management of dentulous mandibular fractures can include application of completely different types of intermaxillary and MMF appliances. Like, vacuum-formed splints with bonded wire cleats for temporary intermaxillary fixation (Lloyd and colleagues, 2001),[12] intraoral cortical bone screws and specially designed metal Otten hooks (also known as Ottenhaken) (Poeschl and colleagues, 2008),[13] Ivy loops/eyelet wiring (Chacon and Larsen, 2004; Touré and colleagues, 2023),[14,15] lingual splint (Chacon and Larsen, 2004; Balasubramanian and colleagues, 2017),[14,16] Tigershtedt arch bars, Tymofieiev, 2012),[17] Erich/Vasyliev arch bars (Blitz and Notarnicola, 2009; Tymofieiev, 2011),[18,19] intermaxillary fixation with bra hook (Pynn and colleagues, 2022),[20] Risdon cables with elastics for patients with primary and mixed dentitions (Marschall and colleagues, 2023),[21] and many more.

However, the treatment of partially or totally edentulous mandibular fractures requires other tactics or their combinations. For example, for the partially edentulous mandibular fractures can be used intermaxillary transmucosal fixation by osteosynthesis miniplates (Melo and colleagues, 2012),[22] the SMARTLock hybrid arch bars (Carlson and colleagues, 2017),[23] pre-existing removable partial dentures as modified splint for intermaxillary fixation (Prajapati and Sathaye, 2018),[24] Weber splint (Tymofieiev, 2020),[25] etc.

For the totally edentulous mandibular fractures was and can be used intermaxillary transmucosal fixation by osteosynthesis miniplate (Wolfe and colleagues, 1989),[26] a Gunning splint with skeletal suspension and MMF (Buchbinder, 1993),[27] Port splint (Tymofieiev, 2012),[17] the resin bite blocks with imbedded arch bars (i.e., Gunning splint) (Chacon and Larsen, 2004; Sharma and colleagues, 2020)[14,5] and MMF, the MMF screws to fix intact complete dentures to the bone with elastics (Newaskar and colleagues, 2013),[28] Gunning splint modified to complete dentures prosthesis (Shah and colleagues, 2018),[4] virtually planned Gunning splints fabricated with wings and holes projected in areas of secure bone anchorage (Duran-Rodriguez and colleagues, 2022),[29] and other similar techniques.

The use of silicone blocks for intermaxillary fixation has already been documented in the report by Ergün (2003).[30] But in their study, it was a different type of silicon block, namely medical grade silicone block which is carved by surgeon depending on the surgical needs of the clinical situation. Such type of carved medical grade silicone block was applied as a pellet for the treatment of minor malocclusion upon the mandible condyle fracture management with a purpose to restore functional occlusion. Medical grade silicone is a flexible silicone elastomermaterial designed for implant or to reconstruct or augment cartilaginous tissue. For the same purposes, application of the pieces of rubber tube in several layers, rubber stoppers from vials for medicinal substances, etc. are described by Tymofieiev (2020).[25]

A-silicones (also known as polyvinyl siloxanes [PVS] or vinyl polysiloxanes [VPS]) (Rubel and colleagues, 2007; Muñoz-Viveros, 2012)[31,32] and C-silicones are elastic and irreversible impression materials and typically used to replicate the structures of the oral cavity. Theoretically, both types of those silicones could also be applied for fabrication of the bite block-splint that can work in combination with MMF screws to immobilize the mandible fragments.

But in this study, we analyze the application only a C-silicone material. C-silicone which was used in our case met all requirements the patient's intraoral situation needed: Low cost of fabrication, possibility to fabricate without assistance of dental technician, and can be adapted to partially edentulous jaws and lack of occlusion. Moreover, the production of such a block splint turned out to be surprisingly fast and possible not only without the presence and help of a dental technician, but also a prosthodontist. Therefore, such blocks can be made by surgeons themselves if they have C- or A-silicone impression material and indurent gel in their office.

Qureshi and colleagues (2016) emphasized that intermaxillary fixation with MMF screws is more efficacious compared to conventional Erich arch bars in the treatment of mandible fracture.[33] The types of the MMF screws and its use is perfectly described in the study by Cornelius and Ehrenfeld in 2010.[11] Also, numerous and distinctive advantages of intermaxillary screws over traditional methods were highlighted in their study.[11] Kim and colleagues (2022) stated that the average time required for screws fixation is 15.38 minutes,[34] what is faster than arch bars fixation to the dentulous arches.

Tooth root injury caused by MMF screws placement is need to be prevented taking into account safe and danger zones for screw insertion (Ma and colleagues, 2023).[35] Hartwig and colleagues in 2017, emphasized that 12.5 percent of the screws caused radiological root injuries.[36]

Speaking about our case, the total speed of installing MMF screws and making a C-silicone bite block-split is many times faster than fixing arch bars on the dental arches or making a Gunning splint by dental technicians.

The average period of fixation of arch bars for the consolidation of fragments of the mandible in case of bilateral fracture is 25 ± 2 days (Tymofieiev, 2011).[19]

Given open reduction internal fixation of the mandibular angle and non-dislocated fracture of the left mandibular body in our case, we endured intermaxillary fixation for three weeks.

However, the findings from the study by Certa and colleagues (2023) suggest that a short duration (less than two weeks) of postoperative MMF may reduce postoperative inflammatory complications following open reduction internal fixation of mandibular angle fractures.[37]

The elastic rubber bands need to be changed every 5–6 days (or as it stretches) (Tymofieiev, 2012).[17]

The technique presented by our team can be used as a new alternative to the application of the MMF screws inserted through the Gunning splints in partially edentulous cases (Chaudhary and colleagues, 2014) and to many other techniques due to a lot advantages.[6]

Absence of pathological effects of metal and plastic inclusions on oral tissues (Tymofieiev, 2012) are among the advantages of the combination of the silicone bite block-splint and MMF screws usage.[17]

Successful application only of two Otten hooks and one elastic rubber band in non-dislocated or slightly mandibular fractures (Poeschl and colleagues, 2008)[13] indirectly but confirm the idea that the use of four MMF screws and two elastics which are presented in our case is more than sufficient (Roccia and colleagues, 2005).[13,38] Nevertheless, up to six MMF screws can be used in similar to our case situations.

C-silicone is the preferred choice for many dentists in Ukraine, but we can theoretically assume that A-silicone material can also be used for the silicone *bite block-splint* fabrication.

So, the Gunning splint has been modified numerous times from the moment of its introduction (Romm, 1986)[39] and during its application by different specialists and in various intraoral circumstances (Goss and Brown, 1975; Dharaskar and colleagues, 2014; Singh and colleagues, 2017; Hwang and Ma, 2021)[40–43]. Juraj Halmoš (1975) described the use of an individually made plastic monoblock for fractures treatment of jaws with an incomplete number of teeth.[44] The monoblock was made with a hole for food intake, attached to the teeth with the help of ligatures and the jaws were immobilized by means of extraoral traction-fixation between the parietal and the chin region.[44] The silicone bite block-splint that we proposed for MMF purposes upon treatment of partially edentulous mandible fractures with a nonexistent occlusion and bite height also partially borrowed the idea from Gunning splint and somewhat resembles a Halmoš monoblock.

Critical analysis of classification system of partially edentulous spaces was performed by Ahila and colleagues (2019).[45] Potential benefits of the classification system for partial edentulism are described in the study by McGarry and colleagues (2002).[46] Same benefits are similar for the classification proposed by our team (i.e., Kennedy–Kyiv Classification System) for the mandibular fractures in situation of partially edentulous arches.

Among benefits are an improving professional communication between colleagues, improving the assessment of treatment complexity and insurance reimbursement according to complexity, etc.

Summarizing our report, it is worthy to note that among the advantages of such a C-silicone bite block-splint comparing to other Gunning-type splints are:

1. No need to involve a dental technician or prosthodontist.
2. Production speed.
3. Significantly reduced fabrication cost.
4. Application of the indurent gel for manufacturing of such block-splint minimize the micromovements.
5. Absence of pathological effects of plastic and metal inclusions on oral tissues.

The dimensions of the silicone bite-block in the three-dimensional plane should be minimal, at the same time, such that the movements of the lower jaw will be impossible when applying rubber traction.

It is recommended to further study the short- and long-term results of the application of the highlighted technique with C- or even A-silicone materials, different number of fracture sites and the degree of their dislocation, the duration of use of intermaxillary rubber traction in different types of fractures and different types of treatment. The safety characteristics of the C-silicone material which was used in our report are highlighted at the safety data sheets for all three components of the impression material set.[47–49]

Treatment of each specific fracture of the lower jaw, which is a multi-functional bone,[50] is a unique challenge even for experienced doctors. This is why analyzing and understanding all possible old and new treatment modalities and combinations is so important. After all, such knowledge can make it possible to propose new methods applying the new combination of existed materials.

CONCLUSIONS

The proposed in this paper technique allows to decrease the time typically required for the Gunning splints fabrication, decrease number of the involved specialists, decrease cost of treatment, and easy for performance. With the advent and understanding of this technique, oral and maxillofacial surgeons will have in their arsenal another option for the treatment of partially edentulous mandible fractures in cases of nonexistent occlusion.

TERM OF CONSENT

Writing patient's consent was obtained for publication the photos.

AUTHORS' CONTRIBUTIONS

Material collection and conceptualization: Fesenko II. Data analysis and interpretation: all authors. Drafting of the manuscript: Fesenko II. Critical revision of the manuscript: all authors. Approval of the final version of the manuscript: all authors.

CONFLICT OF INTERESTS

The authors declare no conflict of interest.

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REFERENCES (50)

1. Khan SA, Tushar, Nezam S, et al. Comparison and evaluation of linear dimensional accuracy of three elastomeric impression materials at different time intervals using vision inspection system: an in vitro study. *J Int Soc Prev Community Dent* **2020**;10(6):736–42 https://doi.org/10.4103%2Fjispcd.JISPCD_282_20
2. Gunning TB. Treatment of fracture of the lower jaw by interdental splints. Am J Dent Sci 1868;2(4):172–9.
3. Fraser-Moodie W. Mr. Gunning and his splint. *Br J Oral Surg* **1969**;7(2):112–5. https://doi.org/10.1016/S0007-117X(69)80006-5
4. Shah SP, Verma VB, Talkal AK, et al. Gunning splint modified to complete dentures prosthesis: a conservative management of edentulous mandibular fracture. *J Clin of Diagn Res* **2018**;12(7):ZD01–ZD03. https://www.doi.org/10.7860/JCDR/2018/32745/11714
5. Sharma B, Sharma P, Goswami R, et al. Construction of a gunning splint; case report on the handling of mandibular fractures in edentulous patients. *Indian J Dent Sci* **2020**;12:36–9. https://doi.org/10.4103/IJDS.IJDS_92_19
6. Chaudhary Z, Sharma R, Krishnan S. Maxillo mandibular fixation in edentulous scenarios:

combined MMF screws and Gunning splints. *J Maxillofac Oral Surg* **2014**;13(2):213–4. https://doi.org/10.1007/s12663-013-0481-z

7. Nosyr OV, Fesenko II, Khrulenko SI. Mandibular fractures: pre-operative panoramic radiography and duplication sign patterns. *J Diagn Treat Oral Maxillofac Pathol* **2021**;5(5):57–66. https://doi.org/10.23999/j.dtomp.2021.5.1
8. Passi D, Malkunje L, Atri M, et al. Newer proposed classification of mandibular fractures: a critical review with recent updates. *Ann Med Health Sci Res* **2017**;7:314–8.
9. Şakar O. Classification of partially edentulous arches. In: Şakar O, editor. Removable partial dentures. Cham: Springer; **2016**:17–21. https://doi.org/10.1007/978-3-319-20556-4_3
10. Tymofieiev OO, Fesenko II, Tymofieiev OO. Condition of the teeth in fracture gap of the mandible. *J Diagn Treat Oral Maxillofac Pathol* **2017**;1(1):41–53. https://doi.org/10.23999/j.dtomp.2017.1.6
11. Cornelius CP, Ehrenfeld M. The use of MMF screws: surgical technique, indications, contraindications, and common problems in review of the literature. *Craniomaxillofac Trauma Reconstr* **2010**;3:55–58. https://doi.org/10.1055/s-0030-1254376
12. Lloyd T, Nightingale C, Edler R. The use of vacuum-formed splints for temporary intermaxillary fixation in the management of unilateral condylar fractures. *Br J Oral Maxillofac Surg* **2001**;39(4):301–3. https://doi.org/10.1054/bjom.2001.0649
13. Poeschl PW, Ploder O, Seemann R, Poeschl E. Maxillomandibular fixation using intraoral cortical bone screws and specially designed metal hooks (Ottenhaken) in the conservative treatment of mandibular fractures. *J Oral Maxillofac Surg* **2008**;66:336–41. https://doi.org/10.1016/j.joms.2007.06.671
14. Chacon GE, Larsen PE. Principles of management of mandibular fractures. In: Miloro, editor. Peterson's principles of oral and maxillofacial surgery. 2nd edition. Hamilton: BC Decker Inc; **2004**:401–33.
15. Touré LB, Ongoiba O, Kasssogué D, et al. Eyelet wiring in closed reduction in the treatment of mandibular fracture: a case report. *East African Scholars J Med Surg* **2023**;5(9):156–7.
16. Balasubramanian S, Panneerselvam E, Sharma AR, et al. Lingual splint for sagittal fractures of mandible; An effective adjunct to contemporary osteosynthesis: a case series with review of literature. *Craniomaxillofac Trauma Reconstr Open* **2017**;1:e9–e14. https://doi.org/10.1055/s-0037-1603578
17. Tymofieiev OO. Manual of oral and maxillofacial surgery (in Russian). 5th ed. Kyiv: Chervona Ruta-Turs; **2012**:456–504.
18. Blitz M, Notarnicola K. Closed reduction of the mandibular fracture. *Atlas Oral Maxillofac Surg Clin North Am* **2009**;17(1):1–13. https://doi.org/10.1016/j.cxom.2008.10.002
19. Tymofieiev OO. Maxillofacial surgery (in Ukrainian). Kyiv: Medicine, All-Ukrainian Specialized Publishing House; **2011**:370–455.
20. Pynn BR, Mauro F, Nish IA. Intermaxillary fixation with bra hooks. *Br J Oral Maxillofac Surg* **2022**;60(6):852–4. https://doi.org/10.1016/j.bjoms.2021.12.007
21. Marschall JS, Barnes S, Kushner GM. Intermaxillary Fixation in the Primary and Mixed Dentition. *Oral Maxillofac Surg Clin North Am* **2023**;35(4):521–7. https://doi.org/10.1016/j.coms.2023.04.002
22. Melo AR, do Amaral MF, de Santana Santos T, et al. Conservative treatment of comminuted mandibular fracture involving maxillomandibular fixation with miniplates. *J Craniofac Surg* **2012**;23(3):893–5. https://doi.org/10.1097/SCS.0b013e31824e2528
23. Carlson AR, Shammas RL, Allori AC, Powers DB. A technique for reduction of edentulous fractures using dentures and SMARTLock hybrid fixation system. *Plast Reconstr Surg Glob Open* **2017**;5(9):e1473. https://doi.org/10.1097/gox.0000000000001473
24. Prajapati A, Sathaye S. Use of pre-existing removable partial dentures as modified splint for intermaxillary fixation in case of guardsman fracture: a case report. *Int J Recent Scie Res* **2018**;9(10)(D):29320–29323.
25. Tymofieiev OO. Maxillofacial surgery and surgical dentistry (in Russian). In two volumes. Volume 1. Kyiv: Medicine, All-Ukrainian Specialized Publishing House; **2020**:813–86.
26. Wolfe SA, Lovaas M, McCafferty LR. Use of a miniplate to provide intermaxillary fixation in the edentulous patient. *J Craniomaxillofac Surg* **1989**;17(1):31–3. https://doi.org/10.1016/s1010-5182(89)80124-6
27. Buchbinder D. Treatment of fractures of the edentulous mandible, 1943 to 1993: a review of the literature. *J Oral Maxillofac Surg* **1993**;51(11):1174–80. https://doi.org/10.1016/s0278-2391(10)80285-x
28. Newaskar V, Agrawal D, Idrees F, Patel P. Simple way of fixing a Gunning-type splint to the bone using intermaxillary fixation screws: technical note. *Br J Oral Maxillofac Surg* **2013**;51(4):e59–e60. https://doi.org/10.1016/j.bjoms.2012.04.075
29. Duran-Rodriguez G, Gómez-Delgado A, López JP. Management of bilateral condylar fractures in an edentulous patient with atrophic mandible using CADCAM technology. *J Maxillofac Oral Surg* **2022**;21(1):124–8. https://doi.org/10.1007/s12663-021-01652-8
30. Ergün SS. Use of silicone block as a pellet in the treatment of minor malocclusion. *Ann Plast Surg* **2003**;51(2):225–6.

https://doi.org/10.1097/01.SAP.0000063744.68992.20

31. Rubel BS. Impression materials: a comparative review of impression materials most commonly used in restorative dentistry. *Dent Clin North Am* **2007**;51(3):629–vi. https://doi.org/10.1016/j.cden.2007.03.006
32. Muñoz-Viveros CA. Impression materials. In: Freedman G, editor. Contemporary esthetic dentistry. St. Louis, Missouri: Elsevier Mosby; **2012**:33–50. https://doi.org/10.1016/B978-0-323-06895-6.00002-5
33. Qureshi AA, Reddy UK, Warad NM, et al. Intermaxillary fixation screws versus Erich arch bars in mandibular fractures: a comparative study and review of literature. *Ann Maxillofac Surg* **2016**;6(1):25–30. https://doi.org/10.4103/2231-0746.186129
34. Kim YG, Yoon SH, Oh JW, et al. Comparison of intermaxillary fixation techniques for mandibular fractures with focus on patient experience. *Arch Craniofac Surg* **2022**;23(1):23–8. https://doi.org/10.7181%2Facfs.2021.00549
35. Ma H, Liu H, Shen Y. Tooth root injury caused by intermaxillary fixation screw placement. Asian J Surg. **2023**;46(12):5822-5823. https://doi.org/10.1016/j.asjsur.2023.08.152
36. Hartwig S, Boettner A, Doll C, et al. Drill-related root injury caused by intraoperative intermaxillary fixation: an analysis of 1067 screw applications. *Dent Traumatol* **2017**;33(1):45e50.
37. Certa M, Chapple AG, Khalifa A, Christensen BJ. Does a short period of maxillomandibular fixation decrease complications in open reduction internal fixation of mandibular angle fractures? *J Oral Maxillofac Surg* **2023**;81(4):406–12.
38. Roccia F, Tavolaccini A, Dell'Acqua A, Fasolis M. An audit of mandibular fractures treated by intermaxillary fixation using intraoral cortical bone screws. *J Craniomaxillofac Surg* **2005**;33(4):251–4. https://doi.org/10.1016/j.jcms.2005.02.005
39. Romm S. Thomas Brian Gunning and his splint. *Plast Reconstr Surg* **1986**;78(2):252–8. https://doi.org/10.1097/00006534-198608000-00024
40. Goss AN, Brown RO. An improved Gunning splint. *J Prosthet Dent* **1975**;33(5):562–6. https://doi.org/10.1016/s0022-3913(75)80171-5
41. Dharaskar S, Athavale S, Kakade D. Use of gunning splint for the treatment of edentulous mandibular fracture: a case report. *J Indian Prosthodont Soc* **2014**;14(4):415–8. https://doi.org/10.1007/s13191-013-0294-2
42. Singh G, Sahni V R, Kaur D, et al. Customized gunning splint for para sagittal palatal split with right alveolar fracture - a case report. *IP Ann Prosthodont Restor Dent* **2017**;3(2):85–7.
43. Hwang K, Ma SH. Use of a monoblock gunning splint in a bilateral condylar fracture in an edentulous patient. *J Craniofac Surg* **2021**;32(3):e235–e238. https://doi.org/10.1097/SCS.0000000000006963
44. Halmoš J. Traumatology of the maxillofacial skeleton (in Russian. Translation from Slovak). Bratislava: Veda, Publishing House of the Slovak Academia of Science; **1975**;113–48.
45. Ahila SC, Suganya S, Muthukumar B. Critical analysis of classification system of partially edentulous spaces: a literature review. *Indian J Multidiscip Dent* **2019**;9:49–57. https://doi.org/10.4103/ijmd.ijmd_43_18
46. McGarry TJ, Nimmo A, Skiba JF, et al. Classification system for partial edentulism. *J Prosthodont* **2002**;11(3):181–93.
47. Safety data sheet: Speedex putty soft. COLTENE/Whaledent AG. Revision date: 22.10.2020. Print date: 27.10.2020.
48. Safety data sheet: Speedex universal activator. COLTENE/Whaledent AG. Revision date: 17.06.2015. Print date: 25.06.2015.
49. Safety data sheet: Speedex light body. COLTENE/Whaledent AG. Revision date: 22.10.2020. Print date: 27.10.2020.
50. Pham TD, Holmes SB, Patel M, Coulthard P. Features and networks of the mandible on computed tomography. *R Soc Open Sci* **2024**;11:231166. https://doi.org/10.1098/rsos.231166

ЗВІТ ПРО ВИПАДОК/МЕТОДИКА

UKRAINIAN LANGUAGE

Часткова вторинна адентія та двобічний перелом нижньої щелепи: застосування прикусного блоку-шини із конденсаційного силікону, гвинтів міжщелепної фіксації та гумових тяг для внутрішньоротової іммобілізації

Євген Фесенко[a,*], Василь Рибак[b] і Олег Мастаков[c]

АНОТАЦІЯ

Кожен перелом нижньої щелепи унікальний. Це потребує індивідуального лікування через різну кількість ділянок переломів, давності перелому, ступінь зміщення уламків, наявність/відсутність інфекції, кількість, розташування та стан зубів тощо. Лікування переломів нижньої щелепи при частковій вторинній адентії ще складніше та зазвичай може включати допомогу зубного техніка. В опублікованій англомовній літературі бракує інформації про застосування прикусного блоку-шини з конденсаційного силікону (C-silicone) в комбінації з гвинтами для міжщелепної фіксації та еластичними елементами для лікування двобічного перелому нижньої щелепи. Ось чому ми представляємо цю нову методику, розроблену нашою командою на основі лікування переломів у 38-річного пацієнта з частковою адентією та відсутньою оклюзією. Також у статті представлено київську модифікацію системи класифікації Кеннеді частково беззубих дуг, яку ми застосували при переломах нижньої щелепи. Модифікована класифікаційна система розглядає не ліковані корені зубів як опорні точки блокування (тимчасові додаткові ретенційні), які підвищують стабільність прикусного блоку-шини та зменшують ймовірність мікрорухів. Крім того, протипоказано видаляти такі корені зубів

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Слово «шина» на верхньому правому значку означає, що стаття містить опис виготовлення та застосування прикусного блоку-шини з конденсаційного силікону у поєднанні з гвинтами для міжщелепної фіксації та гумовими тягами.

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безпосередньо перед фіксацією блоку-шини, оскільки видалення таких коренів може спровокувати альвеоліт на стадії загоєння місць переломів та періоду іммобілізації щелепи, що підвищить ризик видалення блоку для лікування альвеоліту. Проведено огляд опублікованих методик і засобів міжщелепної фіксації, призначених для лікування переломів нижньої щелепи. Розглянуто численні засоби для частково та повністю беззубої нижньої щелепи, а також для щелеп без дефектів зубних рядів. Наведено існуючі шини типу Ганнінга та їх модифікації. Виготовлення в стоматологічному кріслі С-силіконового прикусного блоку-шини та його застосування в комбінації з гвинтами для міжщелепної фіксації та еластичними елементами є новою альтернативою шині Ганнінга. Виготовлення і застосування такого блоку дозволяє скоротити час, який зазвичай необхідний для виробництва шини Ганнінга, зменшити кількість залучених спеціалістів, знизити вартість та спростити лікування.

КЛЮЧОВІ СЛОВА

Конденсаційний силікон (С-силікон), С-силіконовий прикусний блок-шина, гвинти для міжщелепної фіксації, остеосинтез, шина Ганнінга, міжщелепний силіконовий блок, опорні точки фіксації, тимчасові додаткові ретенційні пункти.

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