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- 13.00.00 Pedagogika fanlari
- 13.00.01 Pedagogika nazariyasi. Pedagogik ta'limotlar tarixi
- 13.00.02 Ta'lim va tarbiya nazariyasi va metodikasi (sohalar bo'yicha)
- 13.00.03 Maxsus pedagogika
- 13.00.04 Jismoniy tarbiya va sport mashg'ulotlari nazariyasi va metodikasi
- 13.00.05 Kasb-hunar ta'limi nazariyasi va metodikasi
- 13.00.06 Elektron ta'lim nazariyasi va metodikasi (ta'lim sohaları va bosqichlari bo'yicha)
- 13.00.07 Ta'limda menejment
- 13.00.08 Maktabgacha ta'lim va tarbiya nazariyasi va metodikasi
- 13.00.09 Ijtimoiy pedagogika
- 07.00.00 Tarix fanlari
- 19.00.00 Psixologiya fanlari
- 01.00.00 Fizika-matematika fanlari
- 02.00.00 Kimyo fanlari
- 03.00.00 Biologiya fanlari
- 09.00.00 Falsafa fanlari
- 10.00.00 Filologiya fanlari
- 11.00.00 Geografiya fanlari

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AKTABGACHA VA AKTAB TA'LIMI

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NEUROMUSCULAR DENTISTRY'S PLACE IN DENTAL PRACTICE

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Abstract: Diagnosis and treatment of temporomandibular joint (TMJ) dysfunction and related chronic facial pain syndromes can be very challenging in modern dentistry. When underlying neuromuscular involvement and muscle hypertonicity are not treated, conventional isolated prosthodontic or orthodontic procedures often do not provide sustained clinical effects.

Goal: To assess the diagnostic and therapeutic approaches used in neuromuscular dentistry, with emphasis on the clinical efficacy of custom-made splint therapy and transcutaneous electrical nerve stimulation (TENS) in the treatment of painful temporomandibular joint dysfunction syndrome.

Materials and Methods: Based on an empirical analysis of a typical clinical case, a detailed analysis of the recent academic literature and clinical recommendations was carried out. A neuromuscular approach was used to treat a 68-year-old female patient with chronic painful TMJ dysfunction syndrome, which is characterised by joint crepitus, limited mandibular movement, anterior open bite, tinnitus, and severe recurrent headaches. The treatment protocol was the use of transcutaneous electrical nerve stimulation (TENS) and a specific lower-arch acrylic device ("Orthotic") to re-establish the vertical dimension of occlusion (VDO) and re-establish the natural mandibular position.

Results of the Research: Targeted myorelaxation with TENS successfully stopped aberrant nociceptive pathways, eased spasms in the masticatory muscles, and allowed accurate registration of the mandible's physiological neuromuscular position. The long-term orthotic splint treatment resulted in effective stabilisation of occlusal contacts, elimination of joint sounds and chronic pain symptoms, recovery of limited jaw motions, and long-term functional stability without recurrence of symptoms.

Conclusion: A thorough, multidisciplinary approach that concurrently treats articular structures, occlusal connections, and the surrounding masticatory musculature is necessary for the effective therapy of TMJ dysfunction. The use of modern neuromuscular modalities, such as TENS, specific orthotic appliances, and joint sonography, greatly improves the long-term prognosis and diagnostic accuracy in difficult occlusal rehabilitation.

Key words: neuromuscular dentistry; temporomandibular joint dysfunction; TENS therapy; orthotic appliance; occlusal rehabilitation; masticatory muscle hypertonicity.



Annotatsiya: Zamonaviy stomatologiyada chakka-pastki jag' bo'g'imi (TMJ) disfunktsiyasi va u bilan bog'liq surunkali yuz og'rig'i sindromlarini tashxislash hamda davolash juda murakkab bo'lishi mumkin. Asosiy nerv-mushak buzilishlari va mushaklar gipertonusi davolanmagan hollarda an'anaviy alohida ortopedik yoki ortodontik muolajalar ko'pincha barqaror klinik samarani ta'minlamaydi.

Maqsad: Nerv-mushak stomatologiyasida qo'llaniladigan diagnostik va terapevtik yondashuvlarni, ayniqsa, chakka-pastki jag' bo'g'imining og'riqli disfunktsiya sindromini davolashda individual tayyorlangan shina terapiyasi va teri orqali elektr nerv stimulyatsiyasi (TENS)ning klinik samaradorligini baholash.

Materiallar va metodlar: Tipik klinik holatning empirik tahlili asosida so'nggi ilmiy adabiyotlar va klinik tavsiyalar batafsil tahlil qilindi. Bo'g'im krepitatsiyasi, pastki jag' harakatining cheklanishi, oldingi ochiq tishlov, quloqda shovqin va kuchli takrorlanuvchi bosh og'rig'i bilan tavsiflangan surunkali og'riqli TMJ disfunktsiya sindromiga ega 68 yoshli ayol bemorni davolashda nerv-mushak yondashuvidan foydalanildi. Davolash protokoli okkluziyaning vertikal o'lchamini (VDO) va pastki jag'ning tabiiy holatini qayta tiklash uchun teri orqali elektr nerv stimulyatsiyasi (TENS) hamda pastki tish qatori uchun maxsus akril qurilma ("Orthotic")dan foydalanishni o'z ichiga oldi.

Tadqiqot natijalari: TENS yordamida maqsadli miorelaksatsiya aberrant nositseptiv yo'llarni muvaffaqiyatli to'xtatdi, chaynash mushaklaridagi spazmlarni kamaytirdi va pastki jag'ning fiziologik nerv-mushak holatini aniq qayd etish imkonini berdi. Uzoq muddatli ortotik shina bilan davolash okkluzion kontaktlarning samarali barqarorlashuviga, bo'g'im tovushlari va surunkali og'riq belgilarining bartaraf etilishiga, cheklangan jag' harakatlarining tiklanishiga hamda simptomlar qaytalanmagan holda uzoq muddatli funksional barqarorlikka olib keldi.

Xulosa: TMJ disfunktsiyasini samarali davolash uchun bo'g'im tuzilmalari, okkluzion aloqalar va ularni o'rab turgan chaynash mushaklarini bir vaqtning o'zida davolashga qaratilgan kompleks, multidisiplinar yondashuv zarur. TENS, maxsus ortotik qurilmalar va bo'g'im sonografiyasi kabi zamonaviy nerv-mushak usullaridan foydalanish murakkab okkluzion reabilitatsiyada uzoq muddatli prognoz va diagnostik aniqlikni sezilarli darajada yaxshilaydi.

Kalit so'zlar: nerv-mushak stomatologiyasi; chakka-pastki jag' bo'g'imi disfunktsiyasi; TENS terapiyasi; ortotik qurilma; okkluzion reabilitatsiya; chaynash mushaklari gipertonusi.

Аннотация: Диагностика и лечение дисфункции височно-нижнечелюстного сустава (ВНЧС) и связанных с ней синдромов хронической лицевой боли могут представлять значительную сложность в современной стоматологии. Если лежащие в основе заболевания нервно-мышечные нарушения и мышечный гипертонус не подвергаются лечению, традиционные изолированные ортопедические или ортодонтические процедуры зачастую не обеспечивают устойчивого клинического эффекта.

Цель: Оценить диагностические и терапевтические подходы, применяемые в нервно-мышечной стоматологии, с особым акцентом на клиническую эффективность индивидуально изготовленной окклюзионной шины и чрескожной электрической стимуляции нервов (TENS) при лечении синдрома болевой дисфункции височно-нижнечелюстного сустава.

Материалы и методы: На основе эмпирического анализа типичного клинического случая был проведен подробный анализ современной научной литературы и клинических рекомендаций. Нервно-мышечный подход был применен для лечения 68-летней пациентки с хроническим синдромом болевой дисфункции ВНЧС, характеризующимся крепитацией в суставе, ограничением движений нижней челюсти, передним открытым прикусом, шумом в ушах и выраженными рецидивирующими головными болями. Протокол лечения включал применение чрескожной электрической стимуляции нервов (TENS) и специального акрилового аппарата для нижнего зубного ряда ("Orthotic") с целью восстановления вертикального размера окклюзии (VDO) и естественного положения нижней челюсти.

Результаты исследования: Целенаправленная миорелаксация с применением TENS позволила успешно прервать патологические ноцицептивные пути, уменьшить спазмы жевательных мышц и обеспечить точную регистрацию физиологического нервно-мышечного положения нижней челюсти. Длительное лечение с использованием ортопедической шины привело к эффективной стабилизации окклюзионных контактов, устранению суставных шумов и симптомов хронической боли, восстановлению ограниченных движений челюсти и обеспечению долгосрочной функциональной стабильности без рецидива симптомов.

Заключение: Для эффективного лечения дисфункции ВНЧС необходим комплексный мультидисциплинарный подход, направленный на одновременное воздействие на суставные структуры, окклюзионные взаимоотношения и окружающую жевательную мускулатуру. Применение современных нервно-мышечных методов, таких как TENS, специальные ортопедические аппараты и сонография сустава, значительно улучшает долгосрочный прогноз и диагностическую точность при сложной окклюзионной реабилитации.

Ключевые слова: нервно-мышечная стоматология; дисфункция височно-нижнечелюстного сустава; TENS-терапия; ортопедический аппарат; окклюзионная реабилитация; гипертонус жевательных мышц.

INTRODUCTION

A contemporary perspective on the dentomaxillofacial system's architecture, which sees teeth, muscles, and joints as an interrelated whole and works to create a harmonic connection between them, is the most recent development in dentistry. The neuromuscular idea was not well known in Uzbek dentistry until recently.



A neuromuscular approach to patient treatment is being actively adopted and promoted by a number of training facilities, manufacturers, and professional dentistry groups.

Numerous conferences and symposia on neuromuscular dentistry and the multidisciplinary treatment of patients with occlusal abnormalities are held every year in Russia and abroad. This illustrates how functional neuromuscular movement in dentistry is rapidly spreading around the world ^[1]. Statistics show that malocclusion affects over 90% of people, while abnormalities of the temporomandibular joint (TMJ) and masticatory muscles account for over 65% of headaches. Spinal curvature and airway constriction may result from improper mandibular placement ^[2].

LITERATURE REVIEW

The treatment of temporomandibular joint dysfunction (TMD) and associated occlusal disharmonies is one of the most difficult interdisciplinary problems of modern clinical dentistry. Over 90% of the population exhibits varying degrees of malocclusion, with more than 65% of chronic tension headaches directly linked to masticatory muscle hypertonicity and structural pathomechanics of the temporomandibular joint (TMJ) ^[1, 2].

Traditionally, conventional prosthodontic and orthodontic treatment has been concerned with static dental relationships and hard-tissue alignment. However, clinical experience demonstrates that addressing dental arches in isolation frequently fails to achieve long-term pain relief or structural stability, particularly in complex or decompensated cases ^[3, 4].

To address these limitations, neuromuscular dentistry emerged as a modern paradigm that conceptualizes the teeth, periodontium, masticatory muscles, and TMJ as a unified, dynamic system ^[1, 8]. This technique, developed by Western researchers in the mid-20th century, is based on the physiological course of the mandible and the importance of neuromuscular balance ^[8, 9].

In domestic literature, Petrosov Yu. A. expanded the diagnostic framework by classifying TMJ pathologies into distinct clinical categories—specifically highlighting neuromuscular and occlusal-articular dysfunction syndromes—which provided a more nuanced foundation for targeted therapy ^[5].

RESEARCH METHODOLOGY

In addition to analysing clinical care methods based on a typical case report, this effort entailed a thorough examination of teaching materials, peer-reviewed scientific journals, and international literature.

ANALYSIS AND RESULTS

We offer the following clinical instance in light of the aetiology and categorisation of TMJ dysfunction. One year ago, a 68-year-old female patient came to the Railway Dental Clinic in Samara with complaints of joint crepitus and clicking in the TMJ, left ear discomfort, tinnitus, difficulty completely opening or shutting her jaw (open bite), and ongoing headaches.

Painful TMJ dysfunction syndrome was the diagnosis made for her. According to her medical history, the condition started around three months before she presented. Her pain condition did not improve despite receiving conservative pharmacotherapy on many occasions, which only provided temporary clinical alleviation.

Plan of Treatment:

Creation of the Orthotic, a customised detachable lower-arch device, to properly align the mandible.

Use of TENS (transcutaneous electrical nerve stimulation) twice a week for three months.

First. Orthotic Splint Therapy

At the clinic, the pathology was thoroughly managed. The Orthotic appliance, a detachable temporary clear acrylic splint worn on the lower tooth arch, was chosen as the main therapy technique. It achieves a harmonious neuromuscular occlusion by restoring the lost vertical dimension of occlusion (VDO) and enabling the surrounding muscles and joint structures to adjust to a natural posture ^[6]. TMJ dysfunction-related pain symptoms are reduced, and mandibular alignment is altered by using the orthotic.

The TENS device was first used to generate muscular relaxation in order to build the personalised acrylic splint. Once the mandible was moved into its natural neuromuscular position, a recording paste was placed over the occlusal surfaces of the teeth. The record was taken out of the oral cavity after initial setting and placed on stone replicas for final curing before being fabricated in a lab.

In order to create stable, repeatable occlusal contacts between the upper and lower arches, self-curing acrylic resin was applied to the splint's occlusal surface during the second appointment. For three months, the patient wore the orthotic with gradual modifications, which included selectively grinding the additional resin as the muscles adjusted to the new position and the mandible returned to its ideal relationship.



Two. TENS, or Transcutaneous Electrical Nerve Stimulation

Electrical nerve stimulation using a TENS device (Transcutaneous Electrical Nerve Stimulation) was another component of the patient's rehabilitation regimen ^[7].

To promote relaxation, a specialised myomonitor sends low-frequency electrical impulses to the muscles. Through surface skin electrodes, the battery-operated myomonitor stimulates motor nerves innervating particular masticatory muscle groups. Every 1.5 seconds, the impulses cause coordinated twitches in the mandibular and facial muscles ^[8].

In order to temporarily disrupt aberrant nociceptive pathways and restore localised neuromuscular function, the gadget stimulates peripheral nerve fibres. Increasing the amplitude of motor nerve stimulation improves local blood flow, reduces muscular spasms, and causes rhythmic muscle contractions. This procedure facilitates the restoration of a normal neuromuscular trajectory for the mandible by relaxing the head and neck muscles.

The masticatory muscles become hypertonic when there is malocclusion, which makes the mandible move in an abnormal direction and exacerbates structural dysfunction. Advanced technology is needed to restore an ideal occlusal condition since patients are unable to actively reset this trajectory ^[9]. The patient had TENS treatment and orthotic correction twice a week for six months.

The patient built a stable, functional occlusion and found relief from persistent pain using neuromuscular principles.

In neuromuscular dentistry, other crucial diagnostic techniques include:

Joint sounds in the TMJ region are recorded and assessed using electrosonography. High-sensitivity sensors affixed to the skin covering the joint complexes are used to register sound when the patient opens and shuts their lips to the fullest extent possible. In order to evaluate TMJ integrity, specialised software often analyses acoustic data after recordings are made across four full open-close cycles ^[10].

Another non-invasive method that allows doctors to evaluate articular disc placement and general TMJ mechanics is joint sonography, which records minute joint sounds. Accurate occlusal reconstruction is ensured by precisely determining the mandible's spatial relationship to the maxilla using the collected data ^[11-13].

Common clinical signs of occlusal disharmony include tinnitus, tooth attrition, joint crepitus or clicking during mandibular excursion, limited mouth opening, and persistent headaches. While many doctors try to cure these difficulties purely via normal prosthodontic or orthodontic procedures, such approaches are generally ineffective when underlying neuromuscular involvement is present. These symptoms often indicate more extensive structural dysfunctions that call for all-encompassing diagnostic and treatment approaches, which are the main focus of neuromuscular dentistry.

The combination of cutting-edge technology and a better knowledge of the aetiology has led to significant advancements in the management of difficult TMJ patients. Clinically, traditional orthodontic, prosthetic, or surgical treatments are often ineffective for treating facial pain disorders ^[3].

By demonstrating the physiological connection between muscle hypertonicity, occlusal instability, and TMJ disease in the middle of the 20th century, American researchers made fundamental contributions to neuromuscular dentistry. Clinicians may now precisely detect joint pathomechanics and ascertain each patient's physiological trajectory for the mandible thanks to modern digital diagnostic systems.

The dentomaxillofacial system, which is made up of the osseous structures (maxilla, mandible, and skull), their movable articulation (TMJ), ligaments, tendons, muscles, investing soft tissues, nerves, arteries, and dental arches, is disrupted by TMJ dysfunction. The whole masticatory apparatus may be disrupted by a pathological alteration in any one component, resulting in clinical states that are either compensated or decompensated depending on the severity and each person's potential for adaptation ^[4].

Unilateral mastication, acute hyperextension (large mouth opening), and iatrogenic factors such as non-physiological orthodontic or prosthodontic therapy are among the etiological variables that contribute to TMJ dysfunction. To structure diagnosis, TMJ problems are categorised under the International Classification of Diseases (ICD-10) into Classes XI and XIII:

Class XI:

1. Temporomandibular joint-pain dysfunction syndrome and Costen's syndrome;
2. TMJ instability;
3. "Clicking" jaw;
4. TMJ dysfunction condition that hurts.



Class XIII: Connective tissue and musculoskeletal disorders.

Yu. A. Petrosov's suggested categorisation offers a more thorough clinical approach that divides TMJ dysfunctions into:

- syndrome of neuromuscular dysfunction;
- syndrome of occlusal-articular dysfunction;
- habitual joint dislocations [5].

CONCLUSION AND SUGGESTIONS

In difficult dental operations, including occlusal rehabilitation, full-mouth reconstructions, and the treatment of neck discomfort and other TMJ-related problems, neuromuscular techniques are crucial. Long-term stability and treatment results are enhanced by the use of neuromuscular principles.

ICD-10 and Petrosov's scheme, two TMJ categories, provide an organised method for identifying and treating these complicated diseases.

Beyond conventional orthodontic, prosthodontic, or conservative therapy, managing TMJ dysfunction requires a thorough, multidisciplinary approach. Both the surrounding muscles and the joint tissues must be treated.

Transcutaneous Electrical Nerve Stimulation (TENS), bespoke acrylic orthotic appliances, and joint sonography are important diagnostic and therapeutic techniques in neuromuscular dentistry.

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- 13.00.00 Pedagogika fanlari
 - 13.00.01 Pedagogika nazariyasi. Pedagogik ta'limotlar tarixi
 - 13.00.02 Ta'lim va tarbiya nazariyasi va metodikasi (sohalar bo'yicha)
 - 13.00.03 Maxsus pedagogika
 - 13.00.04 Jismoniy tarbiya va sport mashg'ulotlari nazariyasi va metodikasi
 - 13.00.05 Kasb-hunar ta'limi nazariyasi va metodikasi
 - 13.00.06 Elektron ta'lim nazariyasi va metodikasi (ta'lim sohaları va bosqichlari bo'yicha)
 - 13.00.07 Ta'limda menejment
 - 13.00.08 Maktabgacha ta'lim va tarbiya nazariyasi va metodikasi
 - 13.00.09 Ijtimoiy pedagogika
 - 07.00.00 Tarix fanlari
 - 19.00.00 Psixologiya fanlari
 - 01.00.00 Fizika-matematika fanlari
 - 02.00.00 Kimyo fanlari
 - 03.00.00 Biologiya fanlari
 - 09.00.00 Falsafa fanlari
 - 10.00.00 Filologiya fanlari
 - 11.00.00 Geografiya fanlari



AKTABGACHA VA AKTAB TA'LIMI

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