

Tomislav Badel¹, Jelena Stražanac¹, Miljenko Marotti², Ladislav Krapac³

Liječenje miogenog temporomandibularnog poremećaja okluzijskom udlagom i fizioterapijom: prikaz slučaja

Treatment of Myogenic Temporomandibular Disorder by Occlusal Splint and Physical Therapy: a Case Report

¹ Zavod za stomatološku protetiku Stomatološkog fakulteta Sveučilišta u Zagrebu
School of Dental Medicine University of Zagreb, Croatia

² studentica Stomatološkog fakulteta Sveučilišta u Zagrebu
Student of School of Dental Medicine University of Zagreb

³ Zavod za dijagnostičku i intervencijsku radiologiju KB-a Sestara milosrdnica Sveučilišta u Zagrebu
Sestre Milosrdnice Clinical Hospital Zagreb, Croatia

³ Poliklinika za reumatske bolesti, fizikalnu medicinu i rehabilitaciju „Dr. Drago Čop“, Zagreb
Outpatient Center for Rheumatic Diseases “dr. Drago Čop”, Zagreb, Croatia

Sažetak

Opisana je dijagnostika bolesnika s tendomiopatijom masetera i 18-mjesečno praćenje terapije michiganskom udlagom te kinezioterapije prema Schulteu. Bile su uporabljene tehnike manualne funkcijske analize te diferencijalno-dijagnostički magnetska rezonancija jer je pacijent, zbog dotadašnje loše udlage, imao patološku habitualnu okluziju. No, osim fiziološkog položaja diska bile su uočene samo subhondralne promjene, kao što je osteoartritis sa sačuvanom konturom kortikalne kosti i bez dodatne kliničke simptomatologije. Kako bi liječenje bilo uspješno, u dijagnostici i terapiji potrebna je multidisciplinarna suradnja. Inicijalnoj i palijativnoj terapiji zadaća je kontrola, redukcija i uklanjanje temporomandibularne boli te poboljšanje funkcije cijeloga stomatognatskog sustava. I dok postoji “zlatni standard” u kliničkoj dijagnostici temporomandibularnih poremećaja (klinički pregled, manualne tehnike pregleda, magnetska rezonancija), nema ga u izboru terapijskih oblika. Patofiziološka i neuromuskularna komponenta miogenog temporomandibularnog poremećaja nije u cijelosti objašnjena. Recentni pregledni radovi potvrđuju michigansku udlagu i fizioterapiju kao uspješne metode liječenja temporomandibularnih poremećaja, ali nema dovoljno randomiziranih istraživanja za usporedbu.

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Adresa za dopisivanje

Tomislav Badel
Sveučilište u Zagrebu
Stomatološki fakultet
Zavod za stomatološku protetiku
Gundulićeva 5, 10 000 Zagreb
Tel. ++38514802125
badel@sfz.hr

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Uvod

Temporomandibularni poremećaji čine skupinu bolnih muskuloskeletalnih stanja u žvačnim mišićima, čeljusnom zglobu i okolnim strukturama te su glavni uzrok nedentalne boli u orofacijalnom području (1, 2). Dijagnostičke podskupine karakterizira morfofunkcijsko podrijetlo simptoma i znakova te patofiziološki proces lokalizacije njihova nastanka. To su: tendomiopatija ili miofascijalna bol - obuhvaća patofiziološke promjene u mišićima i/ili tetivama; diskopatija (eng. *internal derangement*) - podrazumijeva promjenu građe ili položaja diska prema kondilu; anteriorni pomak diska - najvažniji je od tih unutarzglobnih poremećaja; osteoartritis - obuhvaća u čeljusnom zglobu lokalizirane aktivne i inaktivne degenerativne promjene hrskavičnih zglobnih površina i koštanih struktura (3, 4).

Za podskupinu pacijenata s miogenim oblikom temporomandibularnih poremećaja uključuju se i sljedeći kriteriji:

Introduction

Temporomandibular disorders (TMDs) belong to a group of painful musculoskeletal conditions of the masticatory muscles, temporomandibular joint (TMJ) and the surrounding structures and are the main cause of non-dental pain in the orofacial region (1,2). Diagnostic subgroups are characterized by morpho-functional origin of signs and symptoms and the pathophysiological process of localizing their origin: tendomyopathy or myofascial pain includes pathophysiological changes in muscles and/or tendons; internal derangement implies changes in the structure or position of the disc with regard to the condyle; the most important of these intraarticular disorders is the anterior disc displacement; osteoarthritis of the TMJ includes localized active and inactive degenerative changes of cartilaginous articular surfaces and osseous structures (3, 4).

povremena ili kronična bol u regiji žvačnih mišića; ili/i bol u regiji mišića tijekom funkcijskog pregleda; i/ili bol mišića na dodir. Isključeni su kao kriteriji izraženi znakovi i simptomi ili radiografski evidentna patologija čeljusnog zgloba (5).

Klinička dijagnostika

Klinička dijagnostika temelji se na glavnim kliničkim znakovima. To su: smetnje i ograničenje pokretljivosti donje čeljusti, bolovi i zvukovi u čeljusnim zglobovima te bol, umor i spazam žvačnih mišića. Popratni znakovi su: glavobolje, bol lica i vrata, bol i šumovi u ušima, pojačano slinjenje i suzenje, bol i pečenje jezika te zubobolja i pečenje u grlu (6-9).

Ortopedski testovi, u koje se ubraja i mjerenje aktivnog i pasivnog kapaciteta otvaranja usta, uvršteni su u kliničke dijagnostičke metode i već prije su korišteni u reumatologiji, ortopediji i manualnoj medicini (10). Oni služe boljoj objektivizaciji kliničkoga stanja i simptoma, bez obzira na to jesu li miogenog ili artrogenog uzroka ili oboje, već prema tome što indicira radiološko snimanje temporomandibularnih zglobova (1).

Radiološka dijagnostika

Klasična dijagnostika artrogenih poremećaja obuhvaćala je isključivo rendgenografiju tvrdih tkiva. Komputorizirana tomografija superiorna je metoda slojevitog prikaza koštanih zglobnih tkiva, a magnetska rezonancija je neinvazivna i neionizirajuća tehnika slojevitog snimanja čeljusnog zgloba u parasagitalnoj i koronarnoj ravnini. Standardno snimanje položaja kompleksa kondila i zglobne pločice obavlja se pri zatvorenim (habitualna okluzija) i maksimalno otvorenim ustima. Najvažniji parametri na T_1 mjeranim snimcima (*anatomski prikaz*) su sljedeći: kontinuitet zglobnih površina, koštane mase zglobne kvržice i kondila te položaj i oblik zglobne pločice. T_2 mjerena snimka služi za određivanje upalnog eksudata (edema) u čeljusnom zglobu (12,13).

Okluzijska udlaga

Procjena učinka okluzijske udlage pratila se u mnogim istraživanjima, iako se u sistematičnim preglednim radovima mogu naći mnoge dvojbe u vezi s rezultatom u doprinosu stomatologiji utemeljenoj na znanstvenim činjenicama. Michiganska, ili često zvana stabilizacijska udlaga, djelotvorna je u liječenju miofascijalne boli i njezin je učinak mnogo izraženiji nego u liječenju bolova artrogenog podrijetla, kao primjerice osteoartrisa. Temeljni učinak te udlage jest mijenjanje naučenog modela djelovanja žvačnih mišića na kretanje mandibule, pri čemu su krajnji dodirni položaj pri zatvaranju usta i ekskurzijskim kretanjama vođenim zubima okluzijski odnosi antagonističkih zuba. Udlagom se trenutačno mijenja habitualna statička okluzija, što programira žvačne mišiće i njihovu relaksaciju zbog do tri milimetra povišene vertikalne okluzijske dimenzije (14-17).

For a subgroup of patients with a myogenic form of TMD the inclusion criteria are: occasional or chronic pain in the masticatory muscle region; and/or pain in the muscle region during a functional examination; and/or painful palpation of the muscles. The exclusion criteria are pronounced signs and symptoms or radiographically evident pathology of the TMJ (5).

Clinical diagnostic

Clinical diagnostics is based on main clinical signs. They are the following: disturbances and limitations of lower jaw mobility, pain and noise in the TMJs as well as pain, fatigue and spasms of masticatory muscles. The accompanying clinical signs are: headaches, pain of the face and neck, pain and noise in the ears, increased salivation and lacrimation, pain and burning of the tongue as well as toothache and soreness of the throat (6-9).

Orthopedic examinations, which include measuring the active and passive capacity of mouth opening, belong to the clinical diagnostic methods that have already been used in rheumatology, orthopedics and manual medicine (10). They are helpful in getting an objective view of the clinical condition and symptoms, whether they are of myogenic, arthrogenic origin or both, which is indicated by radiological imaging of the TMJs (11).

Radiological diagnostic

Traditional diagnostics of arthrogenic disorders included only x-ray imaging of hard tissues. Computerized tomography is a superior method of layered imaging of osseous articular tissues. Magnetic resonance imaging (MRI) is a noninvasive and non-ionizing technique of layered imaging of the TMJ in the parasagittal and coronary plane. The images of the position of the condyle and articular plate complex are normally taken at closed (habitual occlusion) and maximally open mouth position. The most important parameters of T_1 weighted images (anatomic image) are: continuity of articular surfaces, osseous mass of the articular head and the condyle as well as the position and shape of the articular plate. A T_2 weighted image serves to determine the inflammatory exudate (edema) in the TMJ (12, 13).

Occlusal splint

Evaluation of the effects of the occlusal splint has been described in many studies although systematic review papers contain many doubts about the results of its contribution to evidence-based dentistry. The Michigan or so-called stabilization splint is effective in treating myofascial pain, where its effects are more visible than in treatment of arthrogenic pain, for example of osteoarthritis. The basic goal of the Michigan splint is to change the learned patterns of masticatory muscles' effects on mandibular movements, which are determined by contact positions of antagonist teeth upon closing the mouth and by excursive movements guided by teeth. The splint instantly changes habitual static occlusion which leads to programming of masticatory muscles and their relaxation due to 3 mm higher vertical occlusal dimension (14-17).

Fizioterapijske metode

Fizikalna terapija reumatskih poremećaja pacijenta aktivno uključuje u liječenje, a svrha joj je ukloniti muskuloskeletalne restrikcije (bol, detonizaciju) te istezanje hipertoničnih mišića. U većini slučajeva odabire se kao dodatna terapija, odnosno potporna aktivnost uz druga liječenja i preporučenu suradnju s fizioterapeutom (18-19).

Dvije su kategorije fizikalnih postupaka: metode fizikalne terapije i manualne tehnike. Modaliteti fizikalne terapije predstavljaju vrste terapija koje se mogu primijeniti na pacijentu. To može biti termoterapija, krioterapija, ultrazvučna terapija, fonoforeza, iontoforeza, transkutana električna nervna stimulacija (TENS), akupunktura i terapija laserom (20). Fizioterapeut se koristi manualnim tehnikama kako bi različitim masažama reducirao bol. Tri su kategorije manualnih tehnika: mobilizacija mekog tkiva, mobilizacija zgloba i kondicioniranje mišića (21).

Njemački stomatolog Willi Schulte (22) opisao je niz fizioterapijskih masaža i vježbi za postizanje opuštenosti i ponovne koordiniranosti djelovanja žvačnih mišića, kretnji donje čeljusti te položaja i kretnji čeljusnih zglobova. Takva integrirana ciljana fizioterapija za stomatognatski sustav naziva se "kinezioterapijski program prema Schulteu".

Farmakoterapija

Farmakološka terapija najčešće je nadopuna terapiji temporomandibularnih bolova. Prednost se daje nesteroidnim protuupalnim anireumatskim (NSAR-ima) koji se primarno ordiniraju u liječenju bolesti koštano-mišićnih sustava. Za blagu do umjerenu bol preporučuje se analgetik paracetamol, a za liječenje akutne boli ibuprofen. NSAR treba propisivati u najmanjoj učinkovitoj dozi i to što kraće zbog neželjenih popratnih pojava. Često se NSAR-i upotrebljavaju u premaloj dozi kod akutne boli, a u prevelikoj kod kronične (23, 24).

Prikaz slučaja

Mladića, studenta u dobi od 24 godine, njegov je stomatolog poslao na Stomatološki fakultet Sveučilišta u Zagrebu zbog unilateralnih miofascijalnih bolova lica. Tegoba se pojavila iznenada prije sedam mjeseci kada je zbog mišićnog grča na desnom obrazu počeo *gutati riječi* i nije ih mogao normalno izgovarati.

Dotadašnje liječenje i simptomatologija

Obratio se je maksilofascijalnom i oralnom kirurgu te su mu oni odredili okluzijsku udlagu zbog prevencije bruxizma. Prva je udlaga puknula tijekom nošenja, pa je nakon reklamacije dobio novu. Njome se koristio redovito posljednjih šest mjeseci, iako nije mogao ravnomojno zagristi donjim zubima na njezinu okluzijsku plohu. Subjektivno je tijekom nošenja udlage osjećao nižu razinu okluzije na desnoj strani, pa stražnjim zubima nije mogao zagristi ravnomojno i obostrano. Kako nije mogao zagristi međusobno zubima, trenutačno su se na desnoj strani počeli grčiti mišići masetera. Udlagom se nisu mogle ukloniti pacijentove smet-

Methods of physical therapy

Physical therapy of rheumatic disorders actively involves the patient into the course of the treatment and the goal is to remove musculoskeletal restrictions (pain, detoning) and strain of hypertonic muscles. In most cases, it is used as a supporting activity along other treatments with a recommended cooperation with a physical therapist (18, 19).

There are two categories of physical procedures: methods of physical therapy and manual techniques. Modalities of physical therapy represent the kinds of therapy which can be applied on a patient. It can be thermotherapy, kriotherapy, ultrasound therapy, phonophoresis, iontophoresis, transcutaneous electrical nerve stimulation (TENS), acupuncture, and laser therapy (20). Manual techniques: the physical therapist reduces pain by different massage techniques. There are three categories of manual techniques: mobilization of soft tissue, mobilization of the joint, and muscle conditioning (21).

German dentist Willi Schulte (22) described a series of physical therapy massages and exercises to achieve relaxation and regain coordination between parts of masticatory muscles, mandibular movements and the position and movements of TMJs. Such an integrated way of target physical therapy for the stomatognathic system is called kinesiotherapy of the masticatory system by Schulte.

Pharmacotherapy

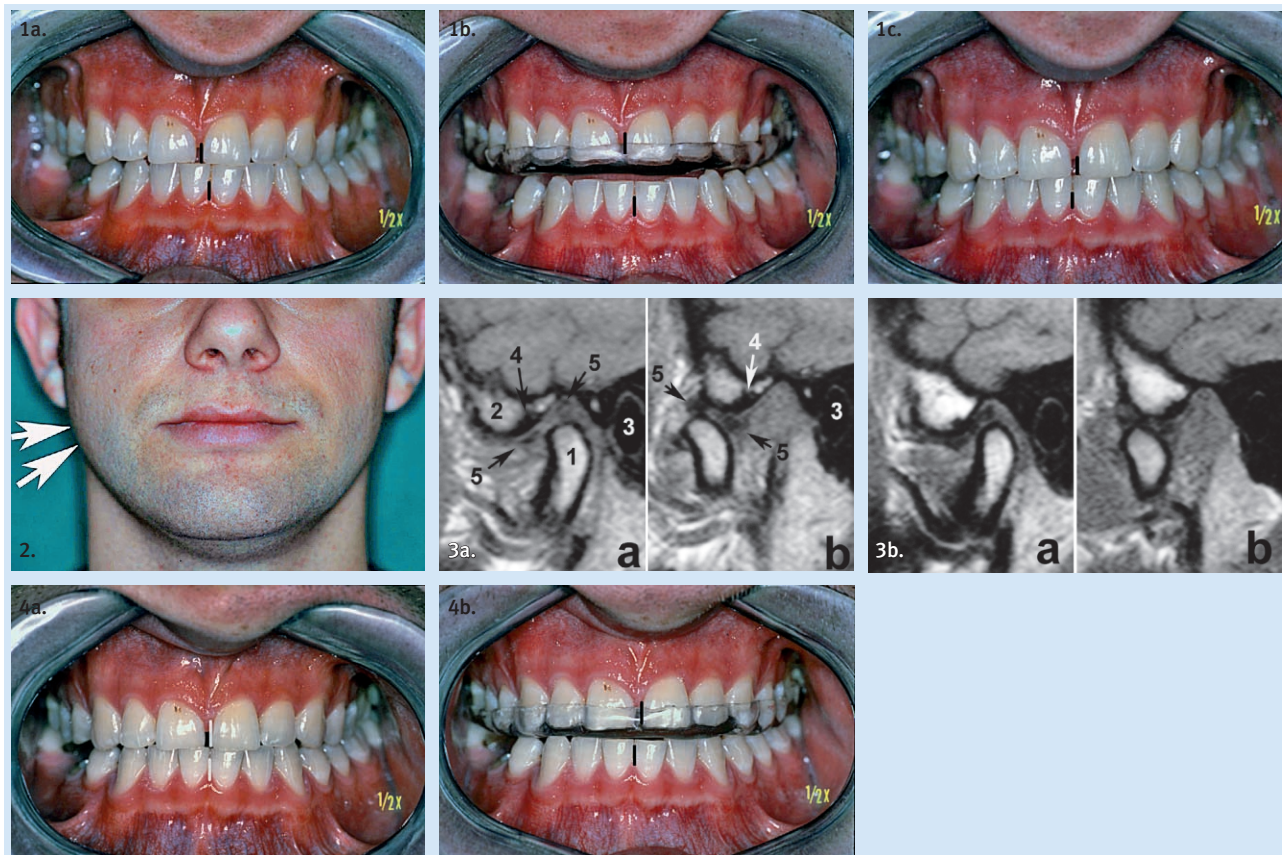
Pharmacologic therapy is the most common supplemental treatment of temporomandibular pain. The advantage is given to nonsteroidal anti-inflammatory drug (NSAID), which are primarily used in treatment of musculoskeletal system diseases. The analgesic paracetamol is recommended for mild to moderate pain while ibuprofen is recommended for treatment of acute pain. NSAID should be prescribed in its smallest effective dose for a shorter period of time due to adverse effects. NSAID is often used in an insufficient dose for acute pain and excessively for chronic pain (23, 24).

Case report

The young man (student, 24) was referred by his dentist to the School of Dental Medicine, University of Zagreb, due to myofascial unilateral facial pain. The disturbance appeared suddenly 7 months ago, when, because of a muscular spasm on the right side of his cheek he started *swallowing sounds* and could not pronounce words normally.

Previous treatment and symptomatology

He approached a maxillofacial and oral surgeon, where he got an occlusal splint in order to prevent bruxism. The original splint broke during wear and he obtained a new one. He wore the splint regularly during the last six months although he could not bite the occlusal plane of the splint evenly with his mandibular teeth. During the wear of the splint, he subjectively felt a lower level of occlusion on the right side which prevented him from biting evenly and bilaterally with the posterior teeth. Since he could not bite down evenly, an immediate masseter spasm would occur on the right side. The usage of this splint could not resolve the patient's complaints,



Slika 1a. Prisilni zagriz uvjetovan nošenjem prvotne udlage

Figure 1a Forced bite caused by the wear of the first splint

Slika 1b. Prisilni zagriz koji je ostvaren nošenjem prvotne udlage s neravnomjernim dodirima u maksimalnoj interkuspaciji

Figure 1b Forced bite caused by the wear of the first splint with uneven contacts in maximum intercuspation

Slika 1c. Habitualna okluzija s pomakom u desnu stranu u odnosu na prisilnog zagriz uvjetovan nošenjem te udlage

Figure 1c Habitual occlusion with a shift to the right with respect to the forced bite caused by the wear of the splint

Slika 2. Otečenost desnog masetera

Figure 2 Swelling of the right masseter

Slika 3a. Magnetska rezonancija lijevog čeljusnog zgloba u položaju zatvorenih (a) i otvorenih (b) usta (1 – kondil, 2 – zglobna kvrčica, 3 – vanjski zvukovod, 4 – subhondralna sklerozacija, 5 – zglobni disk)

Figure 3a Magnetic resonance image of the left temporomandibular joint in open (a) and closed (b) mouth position (1 – condyle, 2 – articular eminence, 3 – external auditory canal, 4 – subchondral sclerosis, 5 – articular disc)

Slika 3b. Magnetska rezonancija desnog čeljusnog zgloba u položaju zatvorenih (a) i otvorenih (b) usta

Figure 3b Magnetic resonance image of the right temporomandibular joint in open (a) and closed (b) mouth position

Slika 4a. Isprovociran patološki habitualni položaj mandibule nakon 3 mjeseca nošenja nove okluzijske udlage (pomak u lijevo)

Figure 4a Provoked pathologic habitual position of the mandible after 3 months of wearing the new occlusal splint (shift to the left)

Slika 4b. Novom okluzijskom udlagom postignut je fiziološki položaj kojim je postignuto neuromuskularno deprogramiranje akcije masetera te maksimalni i ravnomjerni dodiri dodiri antago-nista u centričnom položaju zglobnih kondila

Figure 4b The new occlusal splint achieved a physiological position and neuromuscular deprogramming of masseter as well as the maximum even contacts of antagonists in the centric position of articular condyles

nje, jer je udlagom donja čeljust bila pozicionirana u nefiziološki zagriz s pomakom u lijevu stranu (Slika 1.). Zbog toga je, dok je nosio udlagu, imao nestabilan zagriz, a i kad je nije stavio mandibula mu je bježala udesno kako bi nesvjesno spriječio mišićni spazam.

Pacijent je negirao bruksizam i orofascijalnu traumu bilo koje vrste, nije se žalio na glavobolje i nije nosio ortodontski aparat. Nije se žalio na otežano otvaranje usta, kao što nije povezivao žvakanje hrane s mišićnom boli i spazmom. Bol se javljala samo u aktu spazma. Nije imao bolove u preaurikularnoj regiji, ni otološke simptome.

because the splint positioned the mandible in a non-physiological bite with shift on the left side (Figure 1). Due to that he had an unstable bite during splint wear, and when he was not wearing it, his mandible also leaned to the right, so he unconsciously prevented the muscular spasm.

The patient denied bruxism, orofacial trauma of any kind, did not complain of headaches and had not worn an orthodontic appliance previously. He did not complain about limited mouth opening and he did not relate food mastication with the appearance of muscular pain and spasms. Pain occurred only during spasms. There was neither pain in the preauricular region nor any otological symptoms.

Status i klinička dijagnostika

Zubni status: sanirani zubi bez protetskih radova i djelomičan gubitak zuba u jednoj potpornoj zoni (nedostajali su zubi 45 i 46); anteriorno bridna okluzija i distalno prijeklop gornjih zubi. Habitualna okluzija bila je u prisilnoj propulziji s bridnim zagrizom (klasa III. prema Angleu), bez interkuspidacijskih kontakata, osim na stražnjim parovima molara.

Palpatorno su čeljusni zglobovi bili bez patoloških zvukova i bolova. Uočavala se otečenost desnog obraza u području masetera (Slika 2.). Manualnom funkcijskom analizom ustanovljena je miofascijalna bol desnog masetera izometričkim ispitivanjem mišića zatvarača, kada je pacijent pokazao na desni maseter kao bolno područje (6). Nakon toga je palpacijom masetera potvrđena bolnost. Vidljiv spazam s pulsacijom mišića pacijent je izazvao zagrizom u desnu stranu koji je trajao nekoliko minuta. Aktivno otvaranje usta iznosilo je 65 milimetara, a pasivno 67 milimetara, bez bolova. Bol na desnoj strani lica javila se kod desne laterotruzijske kretnje od 11 milimetara, dok je lijeva kretanja iznosila 12,5 milimetara. Tijekom otvaranja usta dogodila se defleksija mandibule udesno. Bol na analogno-vizualnoj ljestvici (AVS=0–10) pacijent je u trenutku kad se javio mišićni spazam ocijenio kao najjaču moguću (AVS=10).

Dinamičkim kompresijama i translacijama nije pronađena patologija (patološki zvukovi, bol, limitacija otvaranja) vezana za čeljusne zglobove (25).

Radiološka dijagnostika

Mišićni poremećaj (tendomiopatija desnog masetera sa spazmom, bez limitacije otvaranja) potvrđen je klinički (RDC/TMD kriteriji, Axis I), a snimanjem čeljusnih zglobova magnetskom rezonancijom isključen je komorbiditet s artikularnim poremećajem. Ustanovljen je fiziološki položaj zglobnog diska bilateralno s primjerenom kretnjom glavice kondila do zenita zglobne kvržice tijekom otvaranja usta. Subhondralna sklerozacija bilaterano u području funkcijske plohe zglobne kvržice bez gubitka kontura kortikalne kosti može se smatrati radiološkim popratnim nalazom osteoartrisa bez kliničke manifestacije (Slika 3.).

Primarna terapija – fizioterapija

U suradnji s reumatologom-fizijatrom, pacijent je upućen na fizikanu terapiju. Tretman se sastojao od ustaljenog protokola: TENS, tri puta na dan lokalni nesteroidni analgetik ketoprofen (*Fastum gel*) i kinezioterapijski program prema Schulteu (22). Nakon deset tretmana postignuto je znatno poboljšanje (bol na analogno-vizualnoj ljestvici =0,5), ali još s uočljivom pulsacijom masetera u spazmu. Naučene vježbe prema Schulteu nastavio je vježbati tri puta na dan kod kuće.

Sekundarna terapija – okluzijska udlaga

Nakon zadovoljavajućeg napretka u relaksaciji žvačne muskulature, pacijentu je izrađena michiganska udlaga. Kao terapijski položaj mandibule i čeljusnih zglobova uzet je centrični položaj kondila i minimalno podizanje vertikalne okluzijske dimenzije (oko 3 milimetra). Prema gornjim i donjim

Status and clinical diagnostics

Dental status: treated teeth, without prosthodontic appliances, with partial loss of teeth in one supporting area (missing teeth was 45 and 46). Anterior edge-to-edge occlusion, distal overlap of maxillary teeth. Habitual occlusion was in compulsory propulsion with the edge bite (class III by Angle) without intercuspal contacts except on the posterior pairs of molars.

Upon palpation, the TMJs were without pathologic noise or pain. There was a visible swelling of the right cheek in the masseter region (Figure 2). Manual functional analysis was used to determine myofascial pain in the right masseter, by isometric testing of the closing muscles, during which the patient indicated the right masseter as the painful area (6). After that, the pain was confirmed by masseter palpation. The patient provoked a visually noticeable spasm with muscle pulsation by biting on the right side and it lasted several minutes. Active mouth opening was 65 mm and passive was 67 mm, without pain. Pain in the right side of the face appeared during right laterotrusive movement, which amounted to 11 mm, while the left movement amounted to 12.5 mm. Upon mouth opening, the mandible deflected to the right. During the muscular spasm, the patient rated the pain on the analogue-visual scale (AVS = 0-10) as the highest possible. Dynamic compressions and translations did not determine any pathology (pathologic noise, pain, limited opening) related to TMJs (25).

Radiologic diagnostics

A muscular disorder (tendomyopathy of the right masseter with spasm, without limited opening) was clinically determined (RDC/TMD criteria, Axis I) while the MRI of TMJs excluded any comorbidity with the articular disorder. Physiological position of the articular disc was determined bilaterally with the appropriate movement of the condylar head all the way to the zenith of the articular eminence during mouth opening. Bilateral subchondral sclerosis in the functional plane of the articular eminence without loss of cortical bone contours can be seen as a possible radiologic co-finding of osteoarthritis without clinical manifestation (Figure 3).

Primary treatment – physical therapy

In collaboration with a rheumatologist – physiatrist, the patient was referred to physical therapy, which consisted of the usual protocol: TENS, local NSAID ketoprofen (*Fastum gel*), three times per day and a kinesiotherapy program by Schulte (22). A significant improvement was noted after 10 sessions (pain on AVS=0.5) but there was still a noticeable pulsation of the masseter during a spasm. The patient continued to perform the exercises by Schulte at home, three times per day.

Secondary treatment – occlusal splint

After achieving satisfactory improvement in relaxation of masticatory muscles, the patient obtained a Michigan splint. Centric position of the condyle and minimal lift of vertical occlusal dimension (about 3 mm) were chosen as a therapeutic position for the mandible and TMJs. The applied splint

središnjim sjekutićima uočljiv je reprogramirani odnos gornje i donje čeljusti koji se reflektira i u reprogramiranom, tj. terapijskom položaju i zglobnih kondila te u neuromuskularnom vođenju zuba u taj terapijski položaj i istodobnim isključivanjem patološkog habitualnog okluzijskog odnosa (15).

Naknadna skrb

Nakon tri mjeseca redovitog nošenja okluzijske udlage tijekom spavanja, iako ju je bilo djelomice neugodno nositi, postignuto je znatno poboljšanje oralne funkcije (Slika 4.). Još se, ali rijetko, javljao mišićni spazam, što je izravno bilo povezano s hladnim vanjskim podražajem, kao primjerice, pijenjem hladne vode ili osvježavajućih napitaka. Pacijent nije dovodio tegobe u vezu s promjenama vremenskih uvjeta. Iako je imao fiziološko otvaranje usta (iznosilo je 66 milimetara), ipak se povremeno javljala bol u obrazima desno kod kretanja mandibule, a ocijenio ju je na analogno-vizualnoj ljestvici s četiri. No, u položaju maksimalno otvorenih usta nije imao bolove. Ni u mirovanju ni na palpaciju nije imao bolove u maseteru.

Na kontrolnom pregledu nakon 18 mjeseci otkako su počeli dijagnostičko-terapijski postupci, pacijent ističe veliko poboljšanje: bolne tegobe u maseteru ima rijetko – uglavnom jedanput u dva mjeseca i bez posebnog razloga s obzirom na svakodnevno funkcioniranje žvačnog ustava te tu bol ocjenjuje kao AVS=2. Okluzijsku udlagu i dalje nosi noću.

Rasprava

Zato što nema unificirane dijagnostike i klasifikacije dijagnoza, dosad se nisu uzimali u obzir i drugi uzroci orofacijalne boli, nego su se klasificirali kao sindrom miofascijalne bolne disfunkcije. Uvođenjem sustava RDC/TMD u znanstvena istraživanja omogućena je ujednačena usporedba skupina pacijenata iz različitih dijelova svijeta. Radiološka dijagnostika glavni je čimbenik u isključivanju artrogene komponente temporomandibularnih bolova i diferencijalne dijagnostike ostalih mogućih uzroka orofacijalnih bolova (4, 26,27).

Mogućnost aktivnog otvaranja usta antropološka je mjera svake individue, pa je važnije mjeriti iznos dodatnog, pasivnog otvaranja usta. McCarrroll (28) je uveo *endfeel distance*, kao iznos pasivnog otvaranja koje slijedi nakon dosegnutog iznosa aktivnog otvaranja. Prema njegovu mišljenju, srednja vrijednost za muškarce je 3,13 milimetara, a u prikazu ovoga pacijenta iznosila je fiziološka dva milimetra. Schokker i suradnici (29) istaknuli su da pacijenti s rekurentnom glavoboljom i miogenim temporomandibularnim poremećajem imaju pasivno otvaranje veće od pet milimetara. Sustav RDC/TMD predviđa miofascijalnu bol kao dijagnozu koja može biti s limitacijom otvaranja usta ili bez nje. Limitaciju otvaranja miogenog uzroka Hansson i njegovi kolege (10) objašnjavaju posljedicom udlagivanja mišića. Lobbezoo-Scholte i suradnici (5) pronašli su veliku razliku u maksimalnom otvaranju usta između pacijenata (45,8 milimetara) i kontrolnih ispitanika (51,5 milimetara). Mišićnu je bol također imalo 19,3 posto pacijenata, a bol u čeljusnom zglobu 12,9 posto. Kao i u prikazu našeg pacijenta, ako nema zakočenja u otvaranju usta, tada nema ni znatnog iznosa pasivnog otvaranja usta, pa i kod izraženog osteoartritis čeljusnog zgloba (30).

achieved, as opposed to the previous habitual and pathologic position, a significant therapeutic and physiological occlusal relation between the teeth as well as neuromuscular deprogramming of masseter in the therapeutic position of the articular condyles (15).

After-care

An improvement of the oral function was achieved after three months of regular occlusal splint wear during sleep, although the actual wear was only partially comfortable (Figure 4). There were rare occurrences of muscular spasms, which were directly connected to outer cold stimulation such as drinking cold water or refreshing beverages. The patient did not relate the disturbances to the changes in weather conditions. Although there was physiological mouth opening (66 mm), pain in the right cheek upon mandibular movement occurred occasionally and it was rated AVS=4. However, there was no pain in the maximum mouth opening position. There was no pain in the masseter during rest or palpation.

At the control examination 18 months after the beginning of diagnostics and treatment, the patient showed significant improvement: painful disturbances in the masseter are rare, about once in two months and without special causes considering the everyday functioning of the masticatory system, and this pain was rated AVS=2.

Discussion

Due to a lack of unified diagnostics and diagnostic classification, other causes of orofacial pain were not taken into consideration in the past; instead, they were classified as a painful myofascial dysfunction syndrome. By introducing RDC/TMD system into scientific research, an objective comparison of groups of patients from all over the world was made possible. Radiologic diagnostics is the main factor in excluding the arthrogenic component of temporomandibular pain as well as in differential diagnostics of other potential causes of orofacial pain (4, 26, 27).

Possibility of active mouth opening is an anthropologic characteristic of every individual so it is more important to measure the additional, passive mouth opening. McCarrroll (28) introduced the *endfeel distance* as the amount of passive opening which follows after the final amount of active opening. According to him, the average value for men is 3.13 mm, whereas in this case report it was the physiological 2 mm. Schokker et al. (29) determined that patients with recurring headaches and myogenic TMD have passive opening larger than 5 mm. The RDC/TMD system considers myofascial pain a condition which can occur with or without limited mouth opening. Limited opening with myogenic causes has been explained by Hansson et al. (10) as the result of muscle splitting. Lobbezoo-Scholte et al. (5) found a significant difference in maximal mouth opening between patients (45.8 mm) and the control subjects (51.5 mm). Also, 19.3% of patients experienced muscular pain and 12.9% of patients experienced temporomandibular joint pain. As in our case report, if there are no limitations in mouth opening, then there are no significant amounts of passive mouth opening, even in pronounced cases of TMJ osteoarthritis (30).

Inicijalna terapija temporomandibularnih poremećaja obuhvaća palijativne, odnosno simptomatske metode liječenja (michiganska udlaga, fizioterapija, NSAR, bihevioralna terapija, psihološka potpora) (31). U više kvalitativnih sistematskih pregleda liječenja miogenog oblika TMD-a stabilizacijskom (tj. michigansom) udlagom (32-34) nisu pronađene isključivo određene terapijske prednosti, a stabilizacijskom udlagom postiže se učinak kao i korištenjem meke udlage, ravne nagrizne ploče, fizioterapije i akupunkture. Također nema dovoljno standardiziranih randomiziranih i kontroliranih istraživanja kojima bi se potvrdile te znanstvene činjenice. Stabilizacijskom udlagom smanjuje se intenzitet boli u usporedbi s pacijentima koji nisu podvrgnuti liječenju simptoma temporomandibularnih poremećaja.

Baldissara i suradnici (35) istaknuli su terapijski učinak michiganske udlage na miogeni i artogeni oblik TMD-a, ali s naglaskom na bolji učinak u liječenju miogenih bolova, što se objašnjava izravnim djelovanjem udlage na proprioceptivni sustav na relaciji okluzija-žvačni mišići-središnji živčani sustav. Ekberg i njegovi kolege (36) također potvrđuju učinkovitost michiganske udlage tijekom praćenja pacijenata s temporomandibularnim poremećajima šest i dvanaest mjeseci, u odnosu prema kontrolnoj skupini ispitanika u kojoj su sudionici nosili nepčane udlage bez utjecaja na okluzijske odnose zuba. Wassell i suradnici (37) istaknuli su slabiji terapijski učinak stabilizacijske udlage kod starijih pacijenata s artrogenim i miogenim oblikom TMD-a.

U elektromiografskom istraživanju mišićne aktivnosti u različitim dobnim skupinama protetskih i neprotetskih pacijenata, Z. Alajbeg i suradnici (38) ustanovili su da mišićna aktivnost ne ovisi o njihovoj dobi, ali ovisi o tome nose li potpune proteze. Ozubljenost ima učinak na lateralne eksurzivne kretanje na neradnoj strani temporalnog mišića i na radnoj strani masetera. Iako su Ferrario i suradnici (39) temeljili svoje istraživanje na malom broju - prema dobi i dentalnom statusu - nekonzistentnih pacijenata, uočeno je da se udlagom postiže ekvilibrij u djelovanju parova mišića temporalisa i masetera te smanjuje mišićna električna aktivnost. Naeije i Hansson (40) potvrđuju da kratko nošenje stabilizacijske udlage pridonosi simetriji mišićne aktivnosti i smanjenju aktivnosti.

Prije nekoliko godina eksperimentiralo se i s novim oblicima okluzijskih udlaga u terapiji miogenog oblika TMD-a te bruksizma. Jedna od njih bila je nociceptivna trigeminalna inhibicija (NTI, nociceptive trigeminal inhibition), no nije se pokazala uspješnom u praksi jer prekriva samo gornje sjekutiće i sprječava, za razliku od michiganske udlage, kontakte očnjaka (41). Novorazvijena Relaxova udlaga (Unident) koju su u praksu uveli Nilner i suradnici (42) djelotvorna je u liječenju miofascijalnih bolova kao i michiganska.

Clark i suradnici (43) istaknuli su da je tijekom ponovnog pregleda ustanovljena potreba za dodatnom terapijom kod samo 8,6 posto pacijenata, dok se taj broj drugdje kreće u rasponu od 14 do 35 posto. Ako pacijent ima veće funkcijske poremećaje u stomatognatskom sustavu (posebice artrogene), uspjeh fizikalne terapije bit će slabiji kao i kod terapije okluzijskom udlagom. Medlicott (44) je u sistematskom pregledu fizikalnih metoda terapije temporomandibularnih poremećaja pronašao u određenoj mjeri njihovu učinkovitost, jer nema

Initial treatment of TMDs includes palliative, that is, symptomatic treatment methods (Michigan splint, physical therapy, NSAID, behavioral therapy, psychological support) (31). No definitive treatment advantages were found after performing a number of qualitative systematic examinations of myogenic TMD treatment by stabilization (or Michigan) splint (32-34) and the stabilization splint had the same effects as the soft splint, flat bite plate, physical therapy or acupuncture. Also, there were not enough randomized and controlled studies which would confirm these scientific facts. The stabilization splint reduces pain intensity in comparison with the patients who did not undergo treatment of TMD symptoms.

Baldissara et al. (35) confirmed the therapeutic effects of the Michigan splint on the myogenic and arthrogenic forms of TMD, but stressed it was more effective in myogenic pain treatment, which can be explained by the splint's direct impact on the proprioceptive system, especially on the occlusion-masticatory muscles-central nervous system relation. Ekberg et al. (36) also confirmed the effectiveness of the Michigan splint during a 6 and 12-month follow-up of patients with TMDs, with respect to the control subjects, who wore palatal splints that did not affect occlusal relations of the teeth. Wassell et al. (37) discovered a milder therapeutic effect of the stabilization splint in elderly patients with arthrogenic and myogenic forms of TMD.

In an electromyographic examination of muscle activity in several groups of prosthodontic and non-prosthodontic patients, Alajbeg et al. (38) discovered that muscle activity did not depend on age, but whether they wore complete dentures. The number of teeth had an effect on lateral excursive movements on the non-working side of the temporal muscle and the working side of the masseter. Although Ferrario et al. (39) based their research on a small number of, by age and dental status, inconsistent patients, they noticed that the splint achieved equilibrium in the action of temporal and masseter pairs of muscles and that it also reduced electrical activity of the muscles. Naeije and Hanson (40) confirmed that a short-term wear of the stabilization splint contributed to the symmetry of muscle activity as well as to the reduction of activity.

Not so long ago, there were experiments with newer types of occlusal splints in the treatment of the myogenic form of TMD and bruxism. One of these splints was a nociceptive trigeminal inhibition, NTI, which did not turn out to be successful in practice because it only covered the upper incisors and, unlike the Michigan splint, prevented canine contacts (41). The newly developed Relax splint (Unident), introduced into practice by Nilner et al. (42), has proven to be as effective in treatment of myofascial pain as the Michigan splint.

Clark et al. (43) determined that at a follow-up examination, only 8.6% of patients needed additional treatments, while the results of other studies range between 14 and 35%. If the patient has more serious functional disorders of the stomatognathic system (particularly arthrogenic ones), the success of physical therapy will be lesser as well as the occlusal splint treatment. In a systematic examination of physi-

dovoljno istraživanja za usporedbu. Učinkoviti su mobilizacija i aktivno vježbanje pacijenata, osobito kod kuće. Fizioterapija je uspješnija ako se kombinira s drugim terapijskim metodama. Uzrok lošijem rezultatu liječenja može biti komorbiditet temporomandibularnih bolova s bolovima uzrokovanim muskuloskeletalnim poremećajima vrata, ramena i kralježnice.

Prema mišljenju Türpa (45), postoji i prekomjerna, i u nedovoljnoj mjeri, provedena dijagnostika i terapija pacijenata s temporomandibularnim poremećajem. U dijagnostici se lako zamijeni komorbiditet sa sličnim muskuloskeletalnim bolnim poremećajima u relaciji glava-vrat-rame, za što su kvalificirani reumatolozi i fizijatri. Kod našeg pacijenta, osim diferencijalne dijagnostike, bilo je potrebno magnetskom rezonancijom potvrditi nepovoljne jatrogene učinke nasilne i krive terapijske okluzije koja je stvorena nošenjem prvotne udlage. U tom smislu pogrešna terapijska okluzija, kao primjerice dugotrajnije nošenje repositionijske udlage, uzrokuje i lateralni otvoreni zagriz. U primjeni fizikalne terapije samoučenje te pogrešno i nestručno učenje pacijenta oralnim vježbama može biti štetno (46).

U zaključku istaknimo - michiganska udlaga i fizioterapija u liječenju miogenog oblika temporomandibularnog poremećaja jednako su vrijedne metode i obje se mogu preporučiti. Zbog te simptomatske koncepcije liječenja nekonzistentni su rezultati sistemskih preglednih članaka. No, kako se izbjegava kauzalna terapija, prednost imaju neinvazivne i reverzibilne metode, a tijekom duljeg razdoblja nije svrhovita ni farmakoterapija. Dio prikaza slučaja predstavio je kliničke rezultate nakon 18.mjesečnoga liječenja pacijenta s tendomiopatijom masetera uporabom michiganske udlage i oblika fizikalne terapije.

cal methods of TMD treatment, Medlicott (44) found a certain level of effectiveness, but there was a lack of comparable research. Mobilization and active exercises are effective, especially at home. The effects of physical therapy increase if it is combined with other treatment methods. Comorbidity of temporomandibular pain and pain caused by musculoskeletal disorders in the neck, shoulders and spine may cause poorer treatment results.

According to Türp (45), diagnostics and treatment of TMD patients are both excessive and insufficient. Comorbidity with similar musculoskeletal painful disorders of the head-shoulder-neck relation is often neglected in diagnostics and there are specialists in this field, such as rheumatologists and physiatrists. In this case report, apart from differential diagnostics, it was necessary to use magnetic resonance in order to discover the harmful iatrogenic effects of forced and inadequate therapeutic occlusion, which resulted from the wear of the first splint. Therefore, the wrong therapeutic occlusion, for example, a long-term wear of a repositioning splint, can cause a lateral open bite. In applying physical therapy, self-learning or wrong and inexperienced teaching of oral exercises can be damaging (46).

In conclusion, Michigan splint and physical therapy are equally valid and recommendable methods of myogenic TMD treatment. Due to the symptomatic concept of treatment, the results of review papers are inconsistent. However, since causal treatment is avoided, the noninvasive and reversible methods have an advantage. One part of the reported case presented satisfying clinical results after an 18-month treatment of a patient with masseter tendomyopathy using the Michigan splint and physical therapy modalities.

Abstract

Diagnostics of a patient suffering from masseter tendomyopathy as well as the 18-month follow-up of Michigan split treatment and kinesiotherapy by Schulte are described. Techniques of manual functional analysis and the diagnostically differential magnetic resonance were used for diagnostics since the patient had pathologic habitual occlusion caused by a previous inadequate splint. However, apart from the physiological disc position, there were only visible subchondral changes in terms of osteoarthritis with preserved contours of cortical bone and without additional clinical symptomatology. Diagnostics and treatment require a multidisciplinary cooperation which will enable treatment success. The goal of initial and palliative treatment is to manage, reduce and remove temporomandibular pain as well as to improve the functioning of the entire stomatognathic system. While there is an agreed gold standard in clinical diagnostics of temporomandibular disorders (clinical examination, manual examination techniques, magnetic resonance), there is no such gold standard for the choice of treatment methods. The pathophysiological and neuromuscular component of the myogenic temporomandibular disorder has not been completely explained. Recent systematic review papers confirm the value of the Michigan splint and physical therapy as successful treatment methods of temporomandibular disorders. However, there is a lack of randomized, comparable research.

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Address for correspondence

Tomislav Badel
University of Zagreb
School of Dental Medicine
Department of Prosthodontic
Gundulićeva 5, HR-10000 Zagreb
Croatia
badel@sfzg.hr

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